DAILY METAL REPORTER
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METALS

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In This Issue

TRADE ASSOCIATIONS PROMOTE PROGRESS IN USE OF LEAD, ZINC AND COPPER
By CARLETON C. LONG, President
The Metallurgical Society (AIME)

BRITISH METAL MARKETS
By L. H. TARRING
London, England

DOMESTIC METAL MARKET REVIEW

WASHINGTON REPORT

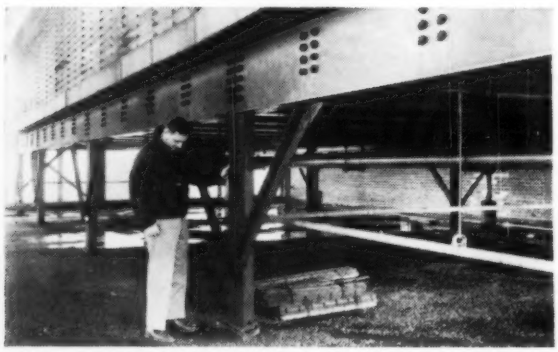
METAL STATISTICS

AUGUST
1960

THE GREAT ATTENUATOR*

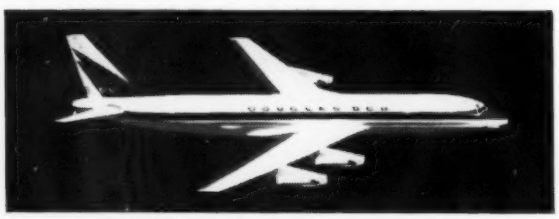
*Attenuation — Diminution of force, intensity, etc.

No other material equals LEAD'S combination of effective attenuation, low cost and compactness



IN DAMPING VIBRATION

Lead anti-vibration pads have proved an effective barrier to vibration created by railroad trains, printing presses, commerical laundry equipment and similar machinery. In the installation shown here, the roof-top cooling tower for an air conditioning system is mounted on lead pads which isolate the vibration from the building.

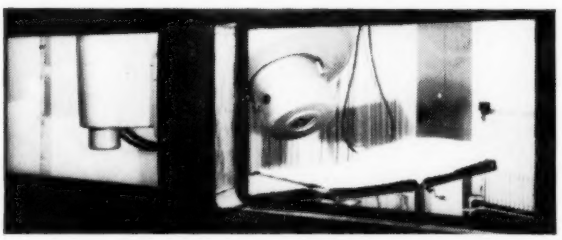


IN QUIETING NOISE

Because it is a dense, limp material, lead is an excellent sound attenuator and isolator. In powder form it is impregnated into the vinyl covering of a new acoustical fabric used to cut down engine roar in both conventional and jet airliners. This leaded fabric is also being used for sound attenuation in other applications such as electric typewriters.

IN RADIATION SHIELDING

X-RAY — Lead has long been the standard material for protection against harmful exposure to X-rays. It is used in the floors, walls, ceilings, doors and windows of X-ray rooms, in the protective clothing for technicians and in the beam-shaping apparatus of the machine itself.



GAMMA RAYS — Attenuation of gamma radiation is directly proportional to the density of the shield. Since lead is the densest of all commonly available materials, it gives the best protection per unit of thickness at lowest cost. It is widely used in nuclear reactors, radioactive waste containers and nuclear laboratories. Photo shows a lead-shielded fork lift truck with leaded glass viewing ports, used for transporting radioactive materials.

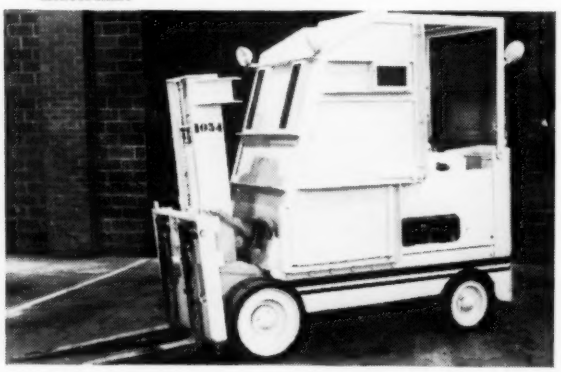


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TABLE OF CONTENTS

Washington Report 4

Trade Associations Promote Progress in Use of Lead, Zinc and Copper 6
By CARLETON C. LONG, President, The Metallurgical Society (AIME)

British Metal Markets 15
By L. H. TARRING, London, England

Domestic Metal Market Review 17

Metal Statistics 19

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Two LINE *Editorials*

Castro says that the people of Cuba are supporting him 100 per cent. At any rate, those who are not supporting him are not regarded as very good life insurance risks.

* * *

A modern educator advances the view that every high school student should be required to learn to speak a foreign language. First it might be a good idea to require them to learn to speak English.

* * *

A London psychiastrist asserts that Mr. K plans to conquer the world by driving it crazy. And sometimes it appears that maybe he has already accomplished his purpose.

* * *

A controversy is raging in England over the question of whether or not Lord Byron was club-footed. It must be great to live in a country where they have time to worry about things like that.

* * *

A disgusted suburbanite writes to ask: "Are insect repellants good for anything at all?" Well, they seem to be remarkably effective in attracting insects and stimulating their growth.

* * *

Some truth may be stranger than fiction, but no kind of truth was ever as strange as that branch of fiction known as fish stories.

BUSINESS IN MOTION

To our Colleagues in American Business . . .

Next time you open the door of your medicine chest remember: it's entirely possible that you are coming face to face with a Revere product that saved the manufacturer of that mirror frame on your medicine chest $10,000 a year.

Here's how this substantial saving came about. The Revere Technical Advisor calling on a leading maker of medicine cabinet mirror frames suggested that perhaps by changing the grain size of the brass he was using he might be able to save money on his polishing costs and at the same time improve the quality of his product. (The 90° bend to which the mirror frames are subjected also had to be taken into consideration.)

The suggestion interested the manufacturer and he asked the T.A. to submit samples.

Samples were made up, using a Revere Brass Strip with a smaller grain size than the manufacturer had been using. Tests showed that, as a result of the change the manufacturer was able to realize a saving of 17¢ per mirror frame on polishing costs alone, with no increased costs in other operations, including the 90° bend. Based on the saving per frame this manufacturer has saved $10,000 per year for the past 4 years!

So the next time you look into the mirror of your medicine chest while shaving, reflect on the saving made possible by properly "fitting the metal to the job." And remember that Revere's Technical Advisory Service may be able to help you realize savings similar to that of the mirror frame manufacturer.

That manufacturer, too, like so many others, has found that only by working closely with your supplier are you able to realize the highest return per dollar invested.

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Washington Report

August 23, 1960

THE strenuous labors of legislators from the mining states were finally rewarded last month as Congress approved and sent to the President a bill to provide subsidy payments to small domestic producers of lead and zinc. The measure (H.R. 8860), which was offered by Rep. Ed Edmondson (Dem., Okla.), was passed by the Senate in a 59 to 28 vote after that body returned from the recess for the Presidential nominations. It was approved by the House earlier by the narrow margin of 197 to 191.

It is still considered possible, however, that the bill will fail to clear the last and most important hurdle —obtaining the signature of President Eisenhower. When the measure was being considered in committee, representatives of the Interior Department registered their opposition to its provisions. Proponents of the measure are marshalling all their resources in an attempt to get the President's signature. At this writing, the bill's chances are no better than fifty-fifty.

The Edmondson measure authorizes stabilization payments to small domestic producers to make up the difference between the market price and a price of 17 cents a pound for lead and 14½ cents a pound for zinc. The bill applies only to those domestic producers who produce or sell up to 2,000 tons of lead and/or 2,000 tons of zinc annually.

Rep. Edmondson, in a wire to President Eisenhower, said the bill approved by both Houses is almost identical to the small producers section of the Seaton Bill which the Administration supported in 1958.

Tariff Measure in Doubt

It is uncertain whether the Senate will take any action on the bill to establish sliding-scale tariffs on lead and zinc, informed sources said.

Prior to the recess for the Presidential nominations, the Senate Finance Committee approved a lead and zinc rider offered by Senator Robert Kerr (Dem., Okla.) to a House-passed revenue measure (H.R. 5547) for the Virgin Islands. The House bill was sponsored by Rep. Wilbur D. Mills (Dem., Ark.), who is chairman of the Ways and Means Committee.

The Mills-Kerr bill provides for imposition of a 2.00c-a-pound duty for lead which would be increased to 3.00c whenever the lead quotation is under 13.50c a pound. The extra 1.00c would be removed whenever the price of lead reaches 14.50c a pound. For zinc, the Kerr measure provides a duty of 1.50c a pound plus another 1.00c when the zinc price drops under 12.50c; the extra 1.00c would be removed when the price goes over 13.50c.

Some sources said Senate leaders would not decide on whether to call up the measure until the President acted on the Edmondson bill.

'Bicycle Case' Appeal

The "Bicycle Case" decision that may have an important bearing on the validity of the U. S. import quotas on lead and zinc will be tested in the Supreme Court this Fall, according to an announcement by Attorney General Rogers. The decision in the "Bicycle Case" by the U. S. Court of Customs and Patent Appeals strips the President of the poyer in so-called "escape-clause" cases to modify specific recommendations by the Tariff Commission, and institute his own remedial measures for industries that claim to be hurt by imports.

The Tariff Commission had voted unanimously higher import duties on lead and zinc although the vote was split evenly on party lines as to the extent of the tariff protection and in addition to the higher duties, three members of the Commission had recommended import quotas. The President disregarded the recommendations for higher tariffs and imposed import quotas that were different from those that the Commission had recommended.

If the lower court's decision should go unchallenged or if the Supreme Court should refuse to pass on the issue involved, it could have an important impact on the U. S. foreign trade policy. It is the contention of officials that the President must have the power to decide what remedy should be applied to give relief to industries that claim distress because of imports, because he alone is in a position to evaluate the overall impact that tariffs will have on the U. S. and its relation with foreign countries.

GATT Hearings Slated

Public hearings by the U. S. Tariff Commission and the Committee for Reciprocity Information on metals and minerals on which the U. S. proposes to offer and ask trade concessions at the forthcoming negotiating sessions of the General Agreement on Tariffs and Trade (GATT) in Geneva, Switzerland, will be held in the Tariff Commission Building here on August 25-September 7.

Deny Copper Bars to Hungary

Also of interest in the field of trade was the disclosure by Secretary of Commerce Frederick H. Muller that the U. S. had rejected an export application to ship $396,403 of electrolytic copper wire bars and cathodes and electrolytic nickel cathodes to Hungary.

Mr. Mueller said that export licensing in the second quarter of this year to Eastern European countries was down about one-third from the total value of commodities approved for shipment to the area in the 1960 first quarter. But licensing for the two quarters combined brought the 1960 first half total up to more than double the value of goods licensed in the comparable period of 1959, and even topped the value of commodities licensed in the whole of last year.

Applications approved in the first half of 1960 amounted to $60 million in contrast to only $14 million in the like period last year, and exceeded by $4 million the total value of licenses granted in the entire year 1959. The report points out, however, that, historically, the amount of goods licensed to the Soviet bloc is considerably greater than that actually shipped.

Trade Associations Promote

Progress in Use of Lead, Zinc and Copper

By CARLETON C. LONG, President, The Metallurgical Society, AIME

The accompanying article is the text of a talk given by Mr. Long, who is director of research, Zinc Smelting Division, St. Joseph Lead Company, before various local sections of the American Institute of Mining, Metallurgical and Petroleum Engineers.

IN THE nonferrous metal industry, three producer-sponsored associations promote technical progress in use of lead, zinc, and copper. These co-operative associations are: The Lead Industries Association, the American Zinc Institute, and the recently-formed Copper Products Development Association.

These associations are supported by the collective efforts of the metal-producing industries. Perhaps we'd better start by defining what we mean by a metal-producing industry. A lead, copper, or zinc producer performs one or more of these functions: 1, mining; 2, beneficiation; 3, reduction to ingot metal (or marketable chemical compound), and 4, marketing.

Scope of Trade Group

The scope of a metal trade association is illustrated by this recent announcement of the American Zinc Institute:

"The American Zinc Institute, a non-profit organization, is the national trade association of the zinc industry. The Institute does not produce or sell zinc, but collects and distributes information relative to the uses of this metal. Its sources of information are research and close-industry contact. Distribution is accomplished by educational programs, consultation, publications, and publicity.

"The services of the American Zinc Institute are available without charge to anyone interested in the utilization of zinc and zinc-coated products."

Functions

Just what are the functions of a metal producer's trade association? Speaking broadly, there are three:

1, It codifies and disseminates statistics and other information on the industry;

2, It promotes uses of the metal, and

3, It supports research on new and present uses of the metal and its compounds.

In what follows, we'll take a brief look at the promotional activities of the lead, zinc, and copper trade associations; and then we'll go on to comment in considerable detail on the research programs sponsored by each of these groups. But, first it is interesting to recapitulate a bit of the history of each of these three important metal trade associations.

Formation of Trade Group

The oldest of these three is the American Zinc Institute which dates from 1918. On July 29th and 30th of that year, about 200 members of the zinc industry met in St. Louis to see what might be done "to perfect an organization whereby the mining and smelting industry might co-operate and work together to solve the problems of the zinc business." Other stated purposes adopted at this initial meeting of the Institute included: "to get all men in the zinc industry as members of the Institute, to effect a statistical organization, to increase the uses of zinc, and to get better galvanizing done."

On September 20, 1918, a second meeting was held, in Chicago, at which officers and 21 directors were nominated and, on November 15, 1918, elected. The initial officers were: president-Charles T. Orr; first vice president- Edgar Palmer; second vice president-James L. Bruce; treasurer-Howard I. Young; secretary-Stephen S. Tuthill. The 21-member Board of Directors evidently proved a bit unwieldy; because, in March of 1919, an Executive Committee was elected consisting of A. P. Cobb. Wm. A. Ogg, C. M. Loeb, F. C. Wallower, and Cornelius F. Kelly.

During its first 42 years, AZI has been guided by four people. Secretary Stephen S. Tuthill who served from 1918 to 1929; Julian Conover, whom many of you know as the genial gentleman who now runs the American Mining Congress, served as secretary from 1929 to 1935; Ernest Gent ran AZI from 1935 until his retirement in 1956 when the present incumbent, Jack Kimberley, took over as executive vice president.

The Lead Industries Association was founded in 1928 by ten producers and fabricators of lead. Unlike the zinc and copper goups which limit membership to producer representatives, the Lead Industries Association's membership is open to lead fabricators as well as producers. Otherwise, its aims, purpose, and function are essentially the same as those of the American Zinc Institute. Felix Wormser ran LIA from its founding in 1928 until 1947 when the present secretary, Robert L. Ziegfeld, took over. At present, about 70 companies are represented by membership in LIA. In addition to ten producers of pig lead, there are seven or eight mining companies who do not do their own smelting; the fabricators make up the balance of the membership.

Copper Group Recently Formed

In contrast to the 42 years of existence of the American Zinc Institute and the 32 years of the Lead Industries Association, the Copper Products Development Association is not yet a year old. Formally organized December 11, 1959, the Copper Products Development Association was put together by six leading copper producers. Clyde Weed is the first president, Charles Cox the chairman. Clyde Williams served as technical director pro tem until the appointment on July 19, 1960, of Dr. Charles H. Moore as full time technical director. The six charter members are: American Metal Climax Company, American Smelting & Refining Company, The Anaconda Company, International Nickel company of Canada, Kennecott Copper Corporation, and Phelps Dodge Corporation.

On February 29th, 1960, five more copper producers joined the association: Inspiration Consolidated Copper Co., O'Okiep Copper Co., Ltd., Tsumeb Corporation, Calumet & Hecla, Inc., and Miami Copper Company.

Subsequently, seven more producers affiliated with the association for a total of eighteen.

Having traced the history of each

of these three metal trade associations, we'll now take a look at some of the specific activities of each. While there are substantial differences in the actual working mechanics, the functional organization is similar for all three groups. Each group has a market development committee and a technical development or steering committee. It is the responsibility of the market development committee to assess the potential consumption and the marketing practicality of expected results from research projects proposed by the technical development committee. It is also the responsibility of the marketing committee to promote the results of successfully-completed research projects.

The technical development committee has the responsibility for making research project proposals, for coordinating these proposals with studies of marketability, and for placing and supervising research contracts

For the most part, the work of the market development committee and of the technical development committee is done by sub-committees deployed over appropriate areas of interest. A little later, we'll examine these relationships as they affect cooperative research programs; but, first, let's take a short look at some of the important non-research activities.

Compiling of Statistics

Both the LIA and the AZI gather statistics on their industries. Because for many years it has successfully operated a system for codifying confidential production statistics from each producer, American Zinc Institute has become the authority on such information as monthly production, by grades, of zinc metal and zinc oxide, smelter shipments, and smelter and customer inventories. Annually, AZI issues a review summarizing all important statistical information on zinc.

One of the uses of consumption statistics is to gauge the effectiveness of promotional activities. Here are some typical examples of work by the promotion arm of the American Zinc Institute.

Zinc oxide is an important paint pigment. The Institute established a traveling panel of paint experts to educate the current generation of paint formulators with respect to the advantages conferred by use of zinc oxide in paint. By invitation, this group of experts appeared before local meetings of the Society of Paint Technology (formerly the Paint & Varnish Production Club Association). Of such high caliber was this presentation and with such great enthusiasm was it received that panel members saw little home life during the first Fall, Winter and Spring that the group toured the country. Currently the panel appears on a spot-demand basis.

Issue Films, Booklets

In collaboration with the American Die Casting Institute, AZI has produced a film, "How Else Would You Make It?" This color film on manufacture of die castings has received thousands of showings and is still going strong.

Similarly, a more recently produced film, "Zinc Controls Corrosion," has also achieved the thousands-of-showings rank. This film portrays the role of zinc in providing cathodic protection.

Galvanizing, historically a major consumer of zinc, naturally receives a large share of the promotion effort.

Last year, the Institute issued "Industrial Procurement Galvanized Steel Sheets." Before this booklet had been out a week, one steel company alone ordered 1,000 copies. Total distribution in the first year is over 6,000 copies.

Now in preparation is the manuscript of an inspector's handbook on testing galvanized products. This handbook describes how galvanized articles are made and how the various manufacturing manipulations affect the qualities, particularly the surface qualities, of the galvanized article. Appropriate testing procedures are then presented in systematic manner.

A small promotional item, but one of continuing popularity, is a series of posters on rats versus galvanized garbage cans. From municipal health offices, the Institute receives a continuing series of requests for copies of the "baffled" rats poster.

Galvanizing Activities

The Lafayette, Indiana, field office of the Institute works with farm groups of all ages to promote use of galvanized sheet and use of metallic zinc paints. Recently, in collaboration with the American Iron and Steel Institute, they have carried out a series of scientific demonstrations showing that galvanized steel buildings painted with zinc oxide are cooler under mid-west summer conditions than competitive construction (especially aluminum) and hence increase livestock and poultry production.

Possibly the oldest continuing galvanizing promotion activity of AZI is the "Seal of Quality" license system for identifying and guaranteeing the coating thickness on sheets bearing an average of 2 ounces of zinc per square foot of sheet, nearly twice as much as on the standard commercial product.

Technical Information

Because the major consumption of zinc die castings is in automotive applications and because many of these applications are decorative as well as functional, the Institute found it desirable a couple of years ago to set up a field office in Detroit so that technical information on zinc die castings, particularly on their finishing, might be made available promptly to automobile designers.

The Detroit office of the Institute works closely with the die casting finish research program both in application of results and in furnishing data. I'll discuss this program in more detail later.

The Institute's staff generates a continuous stream of technical pamphlets and promotional literature. Most of this effort takes the form of technical papers appearing in various trade magazines. Typically, such an article may show how zinc does a better job at a lower cost, or an article may take the form of technical review of a particular use of zinc, such as electroplating.

A monumental achievement in creation of technical laterature on zinc is the recently-published American Chemical Society Monograph No. 142, "Zinc—The Science and Technology of the Metal, Its Alloys & Compounds." To edit this monograph, AZI secured the services of Champ Mathewson, Professor Emeritus of Metallurgy at Yale University, past president of AIME, and the Mathewson after whom the famous Mathewson Gold Medal Award of The Metallurgical Society of AIME is named. This 700-page book presents a comprehensive picture of the zinc industry and of the metal and its uses. Its intended audience is the technically-informed person who is not a specialist in zinc.

Promotion is coordinated by the Industry Development Committee working through a professional staff with experienced supporting personnel. Presently the professional staff includes four engineers at Institute Headquarters, plus four more engineers at field locations.

LIA Promotion Activities

The flavor of Lead Industries Association promotion activities may be savored by a quick look at typical examples.

One of the first efforts by LIA when it was founded was to gather and present in conveniently usable form information on how lead was being or could be used. This effort

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resulted in the publication of a 100-page book, "Useful Information about Lead." This little book, useful in its day, has been superseded by a second book of 230 pages called "Lead in Modern Industry" which LIA published in 1952. A third phase in this same program will be the publication within the next year or two of an American Chemical Society Monograph on the production, usage, and technology of lead This monograph will run 600 to 800 pages and will constitute the most comprehensive compendium on lead yet put together in the English language.

For the past thirty years the quarterly magazine, "Lead," has kept some 50,000 potential users of lead in this country informed about what lead is actually doing. In addition to domestic distribution, "Lead" receives a mailing of about 4,500 copies in Canada and another 1,500 copies in England.

Publicize Specifications

LIA does a great deal of work in developing and publicizing specifications for the use of architects, builders, and plumbers. To support the efforts of the plumbers' union to improve training of plumbers' apprentices, LIA prepared and printed a textbook for the use of apprentices and their instructors. The International Plumbers Union has made this book the standard text on lead for use in their courses. The book is now in its third printing with some 10,000 copies already in use.

The unusually desirable properties of red-lead paint are promoted by a continuing series of red-lead technical letters which are circulated to upwards of 12,000 makers, specifiers, and users of metal-protective paints. The important role played by lead in soldering is detailed in the LIA-prepared "Soldering Manual" published in 1959 by the American Welding Society.

Ceramics, a growing use which consumes around 20,000 tons of lead a year, is covered by a popular technical data book, "Lead in the Ceramic Industries," which has already required issuance of three supplements to present new information.

Technical service in the field is provided by five engineers on the Association staff to all industries which are users or potential users of lead.

As you might well imagine, the Lead Industries Association keeps right on top of health and safety aspects of lead compounds. In November, 1958, the Association sponsored a Lead Hygiene Conference—one outcome of which was the publication in September, 1959, of a comprehensive volume of Conference Proceedings.

This brief review has given you a perspective on the promotion function of the Lead Industries Association. Now let's take a look at where we get the scientific information for the promotion people to promote.

Set Up Technical Units

During the middle and latter part of the 1950's, it became quite clear that there would no longer occur shortages of lead, zinc, and of steel for making galvanized sheet. The two trade associations each laid plans for pushing promotion. This focused attention on the need for new knowledge concerning the properties of lead and of zinc and of the need for knowledge concerning the effect of these properties on both present and new applications. The need to create the technical knowledge necessary to proceed with market development work led the trade associations into product research.

In 1955, the Lead Industries Association established a Technical Steering Committee of which:

"The purpose is to have a group of top-level technical men in the industry who will advise and guide the Board of Directors and the staff in technical and research matters intended for the protection of the markets for lead or for the development of new markets."

Dr. A. J. Philips, director of research for American Smelting and Refining Company, served as the first chairman of the LIA Technical Steering Committee. Harold Lee, then research director and now vice president of the Bunker Hill Company, headed LIA's technical work for the next two years; and now A. D. Turnbull, manager of the research and development division of Consolidated Mining and Smelting Company of Canada, is beginning his second year as chairman of the LIA Technical Steering Committee.

During the latter part of 1957, the American Zinc Institute organized a Technical Steering Committee similar to that already serving the Lead Industries Association. I was asked to serve as chairman of this committee and did so until the AZI Annual Meeting in April of this year when I retired in favor of Dr. Philips of AS&R.

Joint Lead, Zinc Research

As a result of the increased research activities of the LIA and the AZI, plus the interest of foreign lead and zinc producers who wished to participate in a co-operative program of research, the LIA and the AZI entered into a joint agreement to set up and finance an Expanded Research Program—known to the staff as "ERP." This action had the double advantage that research requirements would not be subordinated by promotional demands and that, being freed from the responsibility for supervising research contracts, the existing trade associations' staffs could concentrate on their prime responsibility — promotion.

The actual job was done by a research organizing committee consisting of the presidents and executive secretaries of the two associations, the chairmen of the two Technical Steering Committees, and as chairman of the research organizing committee, a representative of the foreign producers of zinc and of lead. This latter person was Robert Hendricks of Consolidated Mining & Smelting Company of Canada, and it is largely through his leadership of the research organizing committee that the Expanded Research Program came into being on a sound footing.

Dr. Radtke Named Director

In addition to devising policy and developing working mechanisms, the research organizing committee had the all-important responsibility for selecting and engaging a director of research. The credentials of over 300 applicants were examined and, after many months of winnowing, we made a most fortunate choice in the person of Dr. Schrade F. Radtke, P. E. Dr. Radtke assumed his directorship on September 2, 1958. So capably has he handled his responsibility that already he is recognized internationally as an authority on zinc and lead product research.

Profiting again from the experience of the two older groups, the Copper Products Development Association staffed the research direction function at the very beginning of the association's existence. Since one just doesn't go out and engage overnight the caliber of man required for successful direction of trade association research, the Copper Products Development Association wisely set up a pro tem director while hunting for a permanent incumbent. As I mentioned earlier, this pro tem technical director was the eminent Clyde Williams, recently retired from many year's directorship of the world's best known metallurgical research organization, the Battelle Memorial Institute.

Study Engineering Applications

The basic idea that Dr. Williams pursued is this: Before one can successfully implement an extensive research and development program to

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pure molybdic oxide–calcium molybdate

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find new or expanded uses for copper, a thorough study must be made of the various industries that use, or that could use, copper products. These investigations will take the form of engineering applications studies. They will be made by people familiar with the practical and technical phases of the industries to be investigated. These studies will be directed toward the evaluation both of present uses and of proposed new uses. In making these studies, economic aspects will be considered as assiduously as the technical intricacies. Also, it is planned to solicit help from the engineering and operating departments of present users and of potential users. These groups can offer useful, practical perspective. Even further, it is hoped that present and potential users may become sufficiently interested in the evaluations to comment constructively on how the research projects should be organized and where might the work best be done.

What to make the first choice for starting the engineering applications studies is a problem because of the wide diversity of uses for copper. It has been decided to make the first studies on uses pertaining to the transportation and the construction industries and, also, on uses of copper chemicals. These studies will be intensive and imaginative. Some ideas may develop that require on'y minor modifications in present mill and foundry products to create new markets. But, the big ideas—those which will exert the greatest leaverage on the long-range welfare and brass—will likely require a substantial investment in basic research. This the copper producers are prepared to make whenever the technical and market potentials are favorable.

Survey on Publications

In addition to these engineering applications studies, there are to be made surveys which will result in new publications of various kinds that describe and justify both expanded and new uses for copper. Generally speaking, these publications will lie midway in character between current advertising material and technical papers. A common thread of philosophy will unify this technical literature. The theme will be that copper and brass are satisfactory from the production standpoint as well as functionally. Metal users have not always achieved real savings by switching to competitive materials. Often the illusory first-cost savings are more than consumed by increased wear and tear, wastage, and increases in other production costs.

As the engineering applications studies begin to feed back information, there will gradually emerge a definition of the most profitable projects for expanded product research on copper. Even without the detailed engineering applications studies, it is already known that there is a substantial need for corrosion-resistant copper products. Whether thesse products attain their corrosion resistance by alloying, by surface treatment, or by other means, all will receive scrutiny in an attempt to come up with a product that may merit the term "stainless copper."

Typical Research Projects

Now that we've defined the broad functions of metal trade associations and have taken a brief look at how the research function meshes with the other functions of these associations, let's turn to a somewhat detailed examination of some typical research projects. I am more familiar with AZI research than with that on copper or lead, so I'll start with some actual examples of zinc research.

One of the most dramatic examples of the value of zinc application research is the study of finishing of zinc die castings. This work started in April of 1956 and will probably run at least through 1961 before the loose ends are tucked up. We started this project as a methodical study to find cheaper ways to produce better finishing on zinc die castings. The research had just gotten well underway when an emergency arose in the automobile business. Each of three major automobile manufacturers discovered that corrosion of chromium plating on surfaces exposed to weather had become a serious problem. An idea of how serious is gained by noting that the automobile people had already started to design away from chromium-plated die castings simply in order to get around the blister problem. The zinc was in no way to blame for the failure of the chromium plating. Nevertheless the zinc industry — through the AZI — realized that failure of the chromium plating would inevitably lead to the same dire consequences as if the zinc itself were at fault. Fortunately for us, with a research team already in action studying the finishing of zinc die castings, it was easy to reorient the direction of the research to produce specific results that could be used by the automobile people in their plating shops.

New Plating Systems

Conventional chromium plating normally consists of a layer of about 0.4 mils of copper on top of which is plated 0.8 mils of bright nickel on top of which is laid down 0.01-0.03 mils of bright chromium. The corrodents get through cracks in the chromium layer, work on the nickel, and finally expose the zinc-copper couple. The zinc acts anodically to protect the copper, and the resulting corrosion products swell and raise a blister on the chromium surface. The research group has validated two superior plating systems. One is called a duplex-nickel system in which a layer of dull nickel is put down over the copper and this is followed by bright nickel and conventional bright chromium. The two types of nickel have slightly different energy content to the end that corrosion stops before the copper is exposed. The other superior plating system lays down a conventional copper and nickel but finishes up with 0.025 mils or more of bright crack-free chromium. Both the duplex-nickel and the crack-free chromium plating systems are now in use by the automobile parts plating plants. As might be expected, an added benefit from this research has been focusing of management attention on plating room practices with the result that electroplating quality in general has improved.

Autos Using More Zinc

The promotion arm of the Zinc Institute has followed up the research findings diligently. One mechanism in this expanding activity has been the establishment of a Detroit field office. A highly successful promotional activity occurred in November last year when representatives of firms plating automobile parts were invited to a two-day symposium in Detroit on the Finishing of Zinc Die Castings. Since chromium plating blistering was a problem common to all the automobile manufacturers, there was no hesitancy in exchanging technical information. The American Zinc Institute served as the catalyst promoting this interchange. In addition to featuring a review of AZI's extensive improvements in chromium plating, the symposium included dissertations by other chromium plating authorities.

Proof of the success of the research and promotion efforts resides in the increased automotive use of zinc die castings. The attitude of the automobile designers has been turned around. And, now that they can again use chromium plating with confidence, they have gone back to specifying zinc die castings. As a consequence, the 1959 models used more zinc per unit than the '58's, the '60's more than the '59's, and the '61's

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will see a further increase (after allowing for the effects of the "compacts").

The present highly successful zinc die casting alloys were developed in aluminum, a bit of magnesium, and the 1920's. They contain up to 4.3% sometimes a small amount of copper. For some applications—for example those requiring higher mechanical properties, better creep resistance, and such—the present die casting alloys are not adequate. There is a theoretical possibility that zinc alloys containing aluminum in the range of 6-18% and with other added elements may yield alloys die castable in hot chamber machines and possessing the desired mechanical properties. Such a research got under way the first part of last year. It involves a systematic examination of hundreds of compositions; several years may elapse before the possibilities are exhausted.

Galvanized Water Tanks

The sale of galvanized hot water storage tanks has in recent years commanded a smaller and smaller proportion of the market. What has actually happened is that the sale of galvanized tanks has remained roughly constant while the total number of hot water tanks has increased several fold. The only significant competition comes from the so-called glass-lined tank. This type of hot water tank is being promoted aggressively and successfully. In actual experience, under comparable conditions, the failure rate of glass-lined tanks appears to be roughly the same as that of galvanized tanks. In order to provide a sound scientific basis for promotion of galvanized hot water tanks, a basic research project has been established at Case Institute of Technology to investigate the physical chemistry of the zinc-water interface. It is hoped to use this information to develop more corrosion-resistant alloys or to point the way to other means for enhancing the longevity of galvanized tanks. An important discovery not hitherto recorded in the literature is that pressures of the order of 30 lbs. per square inch gage cause zinc to become 0.1 to 0.3 volts more noble than at ordinary atmospheric pressure. Like most basic research, the work at Case seems to move rather slowly; and it is yet too early to forecast practical applications.

Humid Storage Stain

Turning from basic research to empirical applied research, a good example is afforded by a study made at Southern Research Institute to minimize humid storage stain. When galvanized sheets are stored under conditions whereby either rain water or condensation can be trapped between two sheets from which air movement is excluded, rapid formation of a sometimes white, sometimes dark corrosion product often occurs. While this humid storage stain (formerly termed "white rust") ordinarily does not damage the protective value of zinc, the appearance is unsightly. Starting in February, 1957, the group at Southern Research Institute has devoted their efforts partly toward developing quick tests for humid storage stain susceptibility and partly toward evaluating staining resistance of sheets from commercial suppliers. The manufacturers of galvanized sheet currently are treating the finished sheet with dilute solutions of chromates, silicates, or proprietary compounds in the hope of minimizing proclivity to develop wet storage stain. Some treatments seem fairly effective; but, in general, the manufacturers have a long way to go before their product can be called truly stain resistant. The AZI research is guiding them in making these improvements.

To a small degree, galvanized sheets find competition from aluminum-coated sheets. In March, 1958, at a variety of sites, exposure tests were begun of specimens cut from representative galvanized and aluminized sheet. After exposure of about two years, both types of coating seem to be standing up well although some of the cut edges of the aluminized specimens are developing a yellowish stain. It will probably be another three or four years before any marked differential failure shows up.

Zinc Anode Mystery

The first research project set up by AZI was aimed toward unraveling the mystery of why some zinc anodes work and others don't. This problem was successfully solved by the discovery that the activity of zinc anodes is critically dependent on iron content being below a maximum of 0.0014%. It was also discovered that the addition of a few tenths per cent of aluminum and a bit of cadmium further enhance anode activity. After the composition problem had been solved, attention was turned toward developing application information for use in designing commercial installations. A series of zinc anode test installations has been made. At the Mystic Pier in Boston, for example, in co-operation with the Harbor Authority, a section of pier was completely protected by zinc anodes furnished and installed by AZI. Results of this test were widely circulated, and it is hoped that this demonstration will lead to installation of zinc anodes on a significant proportion of the miles and miles of piers and bulkheads located in saline waters. In similar manner, zinc anode demonstration installations have been made on torpedo nets, tug boat hulls, and buoys. In May of 1959, selected compartments of a marine tanker were fitted with zinc anodes. This test is being made both to demonstrate the capability of protecting the steel walls of the tanks from corrosion when ballasted by sea water and, also, to derive quantitative design information for such application of zinc anodes. Zinc anode research has gone so well that it has gotten far ahead of the promotion and marketing activities and so has been tapered off this year.

Lithographing Alloys

Traditionally, the printing industry has employed lithographer's plates rolled from zinc alloys of carefully controlled composition and prepared with surfaces especially designed for the intended use. In recent years, competitive materials such as magnesium, aluminum, and plastic plates have shared the market. Traditional lithographing alloys tend to creep when the plate is subjected to an extraordinarily long press run. Aluminum plate does not creep. AZI in co-operation with the Lithographic Technical Foundation set up a research project aimed toward creating a zinc alloy which in addition to having necessary lithographic properties would also be creep resistant. It is a pleasure to report that laboratory test results on a zinc-copper-titanium alloy indicate that the creep problem has been solved. This laboratory finding is now being checked by commercial runs. Another aspect of this co-operative research project has to do with developing better hydrophyllic properties on the zinc surface. The objective in this development is to produce plates which will continue to give clean printing over a long period of use.

Long-Term Research

In reviewing its objectives and responsibilities, the Technical Steering Committee has concluded that its present research program is a little top heavily weighted on the side of practical application research. To provide better balance and better to undergird application studies, it is the intention of the Technical Steering Committee to establish a series of relatively long-term researches on basic properties of zinc. Practical

problems such as those encountered in humid storage stain of galvanized sheets, in attempts to prepare competitive anodized coatings on zinc surfaces, in studies on corrosion of zinc surfaces in various environments, all point up the need to make a fundamental study of the surface characteristics of zinc. I am happy to say that we have let a research contract to the British Non-Ferrous Metals Research Association to develop basic knowledge of zinc surfaces. This research will cover a period of several years. We are fortunate to be able to place this research with one of the world's most highly respected research organizations.

From these brief comments on some actual examples of our more important research projects, I believe you can see the zinc industry has entered a new era of forward-looking thinking. The zinc industry's dynamic research approach is certain to strengthen the competitive position of zinc and to expand its future uses. Already, we have witnessed the dramatic role played by die casting finishing research on not only salvaging, but returning to a stronger position than ever the tonnage use of zinc in the automobile industry. Other examples, perhaps not so dramatic but collectively of even greater impact will be the dividends accruing from the zinc industry's substantial investment in research.

Lead Studies

Taking a look now at some of the lead research projects being managed by ERP, we find investigations into such subjects as vibration attenuation, lead-base alloys, continuous extrusion of lead cable sheathing, fiber-reinforced lead, sound attenuation, lead-powder metallurgy, lead-coated steel, lead chemicals, low temperature enamels, lead glazes, ceramic dielectrics, lead in glass, and ferroelectrics.

At one time, cable sheathing constituted the largest single use of metallic lead. Periodic scarcities of lead, coupled with unpredictable price fluctuations, forced such research-oriented companies as Western Electric to spend millions of dollars developing substitute sheathings. Successful exploitation of these research results has decreased the use of lead sheathing. Now that future supplies of lead at reasonable price are assured, there is a possibility that lead can retain its remaining cable business by the development of lower cost means for application of lead alloys. The research group making this investigation has now succeeded in continuously extruding all major cable sheathing alloys. The next step is the preparation of a technical brochure summing up the operating characteristics of the new machine with the various alloys. The successful results of this research must then be vigorously promoted by lead producers.

Lead-Base Alloys

As a contribution to fundamental knowledge on the physical metallurgy of lead-base alloys, a systematic investigation has been under way for over a year now. The focus of the investigation is on the recrystallization kinetics of binary lead alloys. Experiments cover aproximately 15 high-purity alloy systems and a total of 80 compositional ranges. The investigation is now being broadened to study the recrystallization, age hardening, and strengthening effects in high purity ternary alloys.

Another basic investigation has to do with properties of lead structures reinforced with mats of metallic fiber. Mild steel, bronze, and stainless steel fiber structures have been studied. Some of these stiffened structures can be rolled to a 95% reduction in thickness with a relatively small amount of cracking. Considerable more work must be done before the possibilities of commercial production of fiber-reinforced lead can be assessed.

A feasibility study for employing lead products in architectural structures for sound attenuation shows some surprisingly interesting possibilities. Suggested as competitively feasible after adequate development are such applications as lead "wallpaper," door linings, machinery enclosures, lead-backed acoustic tile, composite partitions and the like. Interestingly enough, in many of these applications, lead turns out to be the most suitable material because, in the amounts required, it weighs less than equivalent materials. It is for this reason that lead-containing materials are used for sound attenuation in the passenger portions of jet aircraft.

Reinforcing Lead Structure

Earlier I mentioned the possibility of reinforcing lead structures by use of steel fibers. Another approach to reinforcement is to disperse powders in lead. Reinforcing action by powder metallurgy is complex. Not only do the stiff powder particles tend to reinforce, but with some combinations, such as oxide powders or oxide-coated powders, the network of grain boundaries may be pinned and tendency to creep reduced.

More economical methods for producing lead-coated steel are being sought by investigaions into such techniques as vacuum metallurgy, plating, and direct-powder cladding.

A critical survey of many possible areas where organic lead chemicals might be used has been completed. Two of these areas appear interesting enough to warrent more intensive investigation. One of these is a group of related applications in the plastics field, the other is the general category of biological activity as controlled by lead chemicals. Possibilities seem to exist for developing useful lead chemicals to be used as fungicides, insecticides, and bactericides.

It has long been observed that there is a lower incidence of cancer among people occupationally exposed to lead than among the general population. A small but vital effort is being made to determine by means of culture tests the effects of organo-lead compounds on cancer tissue. Preliminary results reveal an inhibiting effect on the growth of cancer cells; but it is, of course, much too early to comment on the possible future role of the effect of lead on cancerous tumors.

Another contribution to basic knowledge is coming from a fundamental study of the thermal and spectral emissivity of lead compounds such as lead selenide, lead sulfide, lead monoxide, and lead telluride.

Fellowship Grants

The research program on use of lead in ceramic materials is being carried out by means of fellowship grants in seven universities. Successful exploitation of enameled aluminum wall panels is based on a formulation containing lead silicate. Low-temperature lead-bearing enamels continue to be studied so that reliable formulations may be evolved for enamels of even lower firing temperature.

Another fellowship is studing the system PbO-Al_2O_3-SiO_2 with reference to a glaze for ceramic whiteware bodies. Another fellowship is studying the wettability of lead glazes upon structural clay bodies.

Phase relationships in systems such as the PbO-Al_2O_3-SiO_2 system are adding to knowledge needed to expand use of lead in ceramic applications as is also an investigation into the fundamental behavior of lead in glass.

An interesting practical outcome of a study of ferroelectrics containing lead compounds is the production of permanent magnets of high intrinsic coercive force and and relatively high remenence. These ferroelectrics are derived from magnetite by the substitutions of lead atoms

(Continued on Page 16)

U. K. COPPER MARKET INFLUENCED BY UNCERTAINTIES IN AFRICA AND THREAT OF STRIKE AT CHUQUICAMATA

Tin Quotations Within Middle Section of ITC Price Range Seen as Reasonable; Lead Supply Restrictions May Continue; Zinc Steady

July 8, 1960

By L. H. TARRING
London, England

THE approaching holiday quietness which often has a rather enervating effect on the copper market during July, this year has been rather pushed into the background by the dramatic developments in the Congo. Fears that the granting of independence on July 1 would not be carried out without difficulty have proved only too well grounded, and the situation today over Katanga is very complex and fraught with grave possibilities.

So far actual production of copper in Katanga and its movement to the Coast has not been very seriously affected according to official statements by the Union Miniere du Haut Katanga but no one is certain how long this state of affairs can continue.

An ancillary fear of course is that there is always the danger of sparks from the Katanga "tinder box," causing trouble in the nearby Rhodesian Copperbelt, although all reasonable precautions are apparently being taken to prevent any trouble. It was also felt that the rather unexpected aggreement between the British Colonial Office and Dr. Banda in Nyasaland was a favorable development as far as peaceful conditions in Rhodesia were concerned.

The immediate effect of the Congo troubles was to push the price of copper up to £260 a ton, but subsequently, with the statement of normal production in Katanga and evidence of a gradually easing world statistical picture, coupled with seasonal holiday quietness, prices receded to around £250. During the past month or so, fully 2,000 tons have been added to the LME official warehouse stocks, and although these, at less than 6,000 tons, are still much too small to be satisfactory, the backwardation has come down to only about £3 a ton.

In view of the not very brilliant showing of United States consumption this year, and current indications that the peak of the recent boom in copper consumption in the U. K. may have been passed for the time being, one might have expected to see copper prices definitely lower than they are, had it not been for the very serious and continuing African uncertainties. These, as far as market sentiment is concerned, have been reinforced to some extent by the threat of a strike at Chuquicamata, in Chile, at the end of September. Moreover, the African workers on the Rhodesian Copperbelt have put in a substantial wage claim, the acceptance of which by the companies in the present form, seems very doubtful. For the present, however, European supplies of copper seem to be in quite a good position

Tin Firmer in July

In the first three weeks of July prices on the London Market had

U. K. COPPER STATISTICS

The British Bureau of Non-Ferrous Metal Statistics reports a substantial increase in U. K. stocks of refined copper during May at 63,832 tons compared with 45,277 tons at the end of April. Blister stocks were slightly lower at 13,976 tons (14,127). Of the refined stocks consumers held 32,691 tons (26,261 tons. U. K. output of refined in May was 11,053 tons of primary and 8,262 tons of secondary, a total of 19,315 tons (16,083 tons). Consumption of copper in May improved to 63,659 tons (including the copper content of scrap) compared with 58,678 tons in April. As will be seen from the detailed figures below, consumption this year is running much ahead of the corresponding period of 1959.

Unalloyed Copper Products	May 1960	Jan.-May 1959	Jan.-May 1960
Wire*	23,755	89,779	118,774
Rods bars and sections	1,983	8,228	8,837
Sheet, strip and plate	5,670	23,627	25,415
Tubes	5,563	26,094	30,354
Castings and misc.	650	3,250	3,250
Alloyed Copper Products			
Wire	1,854	6,996	8,912
Rods, bars and sections	14,192	54,822	69,588
Sheet, strip and plate	10,387	41,042	51,530
Tubes	1,984	8,731	9,558
Castings and misc.	7,284	30,970	36,598
Copper sulphate	3,661	17,456	13,540
Total all products	77,983	310,995	376,356
Copper content of output	63,659	252,097	309,222
Consumption of refined copper†	46,406	188,096	232,507
Consumption of copper and alloy scrap‡ (copper content)	17,253	64,001	76,715

* Consumption of H. C. copper and cadmium copper wire rods for wire and production of wire rods for export.
† Virgin and secondary refined copper.
‡ Consumption of copper in scrap is obtained by the difference between copper content of output and consumption of refined copper, and should be considered over a period since monthly figures of scrap consumption are affected by variations in the amount of work in progress.

U. K. ZINC STATISTICS

U. K. stocks of zinc at the end of May, according to the British Bureau of Non-Ferrous Metal Statistics, were 52,470 tons (20,501 tons held by consumers) compared with 54,491 tons (20,296 tons by consumers) a month earlier. U. K. production of primary zinc was only 4,652 tons against 6,165 tons in April. Consumption was moderately higher in May at 30,848 tons against 28,069 tons the previous month, and for the five months shows an appreciable increase over last year, as detailed below:

	May 1960	Jan.-May 1959	Jan.-May 1960
Brass	10,876	43,658	53,412
Galvanizing	8,271	39,186	41,490
of which:			
General	2,861	13,522	14,593
Sheet	1,986	10,177	10,009
Wire	1,977	8,350	9,453
Tube	1,447	7,137	7,435
Rolled zinc	2,304	10,293	10,521
Zinc oxide	1,832	11,891	11,119
Zinc diecasting and forming alloy	5,552	20,803	28,381
Zinc dust	1,082	4,654	5,552
Miscellaneous uses	931	4,496	4,827
Total all trades	30,848	134,981	155,302
of which:			
Slab zinc			
High purity (99.99%)	6,172	22,415	31,167
Electrolytic and high grade (99.95%)	5,877	26,052	29,601
G.O.B. Prime Western and debased	11,222	49,703	55,932
Other virgin material	223	1,032	1,112
Remelted zinc	531	2,316	2,955
Scrap — (zinc content)			
Zinc metal, alloys and residues	2,251	13,523	12,955
Brass and other copper alloys	4,572	19,940	21,580

U. K. TIN STATISTICS

U. K. consumption of tin in May at 1,902 tons showed an improvement over the 1,774 tons consumed in April, according to the figures of the British Bureau of Non-Ferrous Metal Statistics. U. K. production in May was 2,429 tons of primary and 21 tons of secondary, against 1,645 tons and 14 tons secondary in April. Stocks at the end of May were 10,565 tons, of which 1,444 tons were held by consumers compared with 10,349 tons of which 1,440 tons were held by consumers at the end of April. Details of consumption are given below:

	May 1960	Jan.-May 1959	Jan.-May 1960
Tinplate	947	4,051	4,869
Tinning:			
Copper wire	38	235	212
Steel wire	9	45	47
Other	68	326	335
Total	115	606	594
Solder	159	898	835
Alloys:			
Whitemetal	248	1,247	1,197
Bronze & gunmetal	219	842	1,058
Other	39	167	199
Total	506	2,256	2,454
Wrought Tin*			
Foil and sheet	18	134	110
Collapsible tubes	17	93	112
Pipes, wire & capsules	3	18	14
Total	38	245	236
Chemicals and other uses‡	137	551	636
Total all trades	1,902	8,607	9,624

*Includes Compo and "B" metal.
‡ Mainly tin oxide and tin compounds.

AVERAGE BRITISH PRICES FOR COPPER, TIN, LEAD, ZINC

(Per Long Ton)

Mean of Bid and Asked Cash Quotation at Close of Morning Session on London Metal Exchange

	COPPER			TIN			LEAD		ZINC	
1960	Cash	3 Months	Settlement	Cash	3 Months	Settlement	Current Month	3rd Following	Current Month	3rd Following
January	259 5 3	246 8 9	259 12 0	791 7 6	787 11 0	791 14 0	74 15 8	74 10 6	94 11 5	91 14 11
February	263 17 5	245 17 6	264 5 0	792 7 5	790 3 10	792 15 3	73 17 3	73 15 6	88 17 2	88 18 5
March	253 5 4	237 14 10	253 11 4	787 11 0	786 15 0	787 17 10	76 5 4	75 7 4	90 3 2	88 17 12
April	262 2 1	244 15 0	262 8 5	790 11 4	785 5 0	790 18 11	77 10 6	76 11 5	92 8 7	89 15 11
May	248 4 8	243 0 3	248 9 7	785 1 4	784 0 0	785 7 9	77 8 3	76 16 6	92 1 11	91 9 1
June	250 15 0	244 2 6	250 19 3	793 5 0	789 3 4	793 11 5	73 7 6	74 0 8	90 11 11	90 3 10
July	254 11 7	246 19 5	254 16 11	812 10 3	808 9 9	812 16 8	71 4 10	72 0 7	90 4 8	89 15 11

a firmer tendency, and having moved into the £820's there was a good deal of anticipation that it would not be long before the £830 mark was reached. However, the higher level coincided with the end of the Buffer Stock taking up warrants against earlier purchases (which had a good deal to do with the tightness in nearby metal) together with increased Straits shipments and the quietness often associated with the peak holiday season.

Lead Supply Restriction

Comparatively recently it looked as if some lead producers at present restricting supplies to the open market might refuse to continue to do so after the present arrangement ends on September 30, for fear that their rising burden of stocks might become too heavy.

However, present indications are very strong that they will be willing to continue restrictions on their present basis for at any rate a further six months.

Zinc Staedy

Generally speaking the zinc market has maintained a very good appearance on this side of the Atlantic. Apart from the usual holiday influences, consumption on the Continent has remained high and the U. K. offtake has been quite well maintained.

U. K. LEAD STATISTICS

According to the British Bureau of Non-Ferrous Metal Statistics U. K. production of refined lead in May was 8,746 tons against 8,099 tons the previous month. Stocks at the end of May comprised 37,866 tons of imported refined and 7,791 tons of English refined, a total of 45,657 tons, compared with 50,363 tons a month earlier. Of the end of May stocks, consumers held 13,739 tons of imported and 6,472 tons of English refined. Consumption in May was sharply higher at 33,459 tons (28,148 tons). Details are given below:

	May 1960	Jan.-May 1959	Jan.-May 1960
Cables	8,434	39,731	41,257
Batteries — as metal	3,400	12,013	17,307
Battery oxides	3,165	10,744	15,014
Tetraethyl lead	2,451	9,304	9,777
Other oxides and compounds	2,349	10,729	12,010
White lead	699	3,232	3,548
Shot (incl. bullet rod(	507	1,661	2,336
Sheet and pipe	6,711	27,232	30,680
Foil and collapsible tubes	321	1,416	1,876
Other rolled and extruded	771	2,630	3,285
Solder	1,455	5,846	6,706
Alloys	1,925	7,993	8,645
Miscellaneous uses	1,271	5,532	6,218
Total consumption	33,459	138,063	158,659
of which:			
Imported virgin lead	16,572	71,303	79,406
English refined	8,517	29,176	37,862
Scrap including re-melted	8,370	37,584	41,391

Progress in Use of Metals

(Continued from Page 14)

in the magnetite cubic crystal.

There you have a sampling of lead and zinc research work. Bearing in mind that what I've related is only a representative sample, I think you'll agree that our research director must indeed be a busy man. He is. At present he is supplemented by a professional staff of two, and they all are busy as the proverbial beavers.

Research Costs

Those of you who have had any experience in managing research know that if there is one fundamental truth about research it is this—research costs money! Where does the money come from?

Basically, in all three trade organizations, research costs are met by cents-per-ton assessments on members' production. Actual mechanics become a bit involved when allowance is made, for example, for mines that sell ore instead of metal and/or other special situations. Here is how the Copper Products Development Association apportions research costs.

Refined copper produced by or for the account of a member from its own ores—assess 100% of tonnage.

Refined copper content of material purchased by a member for smelting and/or refining (includes toll treatment by a member for a non-member): material for smelting, assess 12.5% of tonnage; material for refining, assess 7.5% of tonnage, and material for both, assess 20% of tonnage.

Copper content of material sold by a member: material for smelting and refining, assess 80 per cent of tonnage, and material for refining, assess 92.5 per cent of tonnage.

Assessments for current budget year are made on basis of production reported for the previous calendar year.

The copper producers have also agreed that no single producer shall be assessed more than $100,000 per year, and no single producer shall be asked to carry more than 25 per cent of the total load.

I should like to close these remarks on the role played by metal trade associations in co-operative research by citing an example that is not only topical but one that epitomizes the value of co-operative research. I refer to a research contract that AZI has just let to develop processes for spot welding galvanized steel sheet. All of the automobile companies are moving toward unitized body construction. It is essential, where the body has to carry the operational stresses, that corrosion of relatively thin stress-carrying members be prevented. Extensive exposure testing by the auto people over the past 6 years has shown zinc-coated steel to be by far the most satisfactory material to use for under body construction. Corrosion protection is required for the body bottom and up the sides for a distance of about 18 inches above the doorsill. Of the various zinc coatings, that produced by galvanizing appears superior. The only drawback to use of galvanized sheet is that with present resistance welding equipment it costs more to weld galvanized than plain steel. The extra cost comes from more frequent interruptions to dress or replace the spot welding electrodes which tend to alloy with the zinc and to soften.

The stakes on this research are high. When we come up—hopefully about a year from now—with an acceptable procedure for production welding of galvanized sheet, there will open a brand new market for at least 100,000 tons of zinc a year. This one new use alone would represent roughly a 10 per cent increase in total domestic zinc consumption. This, together with an indicated further substantial increase in consumption of zinc for die castings, presages a bright future for zinc. Qualitatively, I believe the same can be said for the other two members of the triumvirate—lead and copper.

True, research costs money; but, through the device of trade association sponsored research, we are learning how to convert research costs too big to be handled by any one company into profits for all. To me, it is a privilege to be associated with such constructive endeavor—just as it is an honor and a privilege to talk with you this evening.

CRISIS IN CONGO CONTINUES TO CAST SHADOW OVER COPPER MARKET AND HELPS TO KEEP PRICES STEADY

Export Activity Also a Firming Factor as U. S. Producers and Smelters Hold 33c Quotation; Lead and Zinc Quiet; Aluminum Products Advanced

August 23, 1960

THE Congo continued to cast a long shadow over the copper market during the month in review. The continuing crisis in the new African republic was a factor in keeping domestic copper prices stable in spite of light demand from U. S. consumers. Export activity also aided domestic producers and custom smelters to hold to their price of 33.00c a pound delivered.

Another situation which market factors have been keeping an eye on is the renewal of the labor contract at Anaconda's big Chuquicamata mine in Chile. The present contract expires September 30. The company and union representatives have been meeting fairly regularly and Anaconda is seeking to reach an agreement before expiration of the present contract. The Chilean Government's conciliation board also has been sitting in on some of the meetings. Chuquicamata produces about 23,000 net tons of copper a month. Whether a strike can be averted at the mine remains to be seen. There are some in the industry who believe that the union, if it follows its historical pattern, will call a strike if for no other reason than to show the workers that it is protecting their interests.

On the export side, the Japanese Ministry of Trade is reported to have given the wire and cable manufacturers in that country authorization to purchase 5,000 tons of electrolytic copper, for shipment to the end of September. Recent purchases by Japan are presumed to have been in anticipation of this authorization.

July Copper Statistics

On the surface the copper statistics for July made a good showing. There was a decrease in domestic and foreign crude production and a decrease in refined output at home and abroad. However, there was a big drop in domestic and foreign deliveries of refined copper and a substantial increase in foreign refined stocks. On an overall basis, the world's crude output in July exceeded deliveries by 40,811 tons, which indicated an imbalance between supply and demand.

Domestic refined copper statistics for July follow in tons, with the June totals in parentheses: production, 129,771 (161,073); deliveries to fabricators, 83,788 (106,207), and stocks at end of month, 91,714 (87,667). Combined domestic and foreign refined copper July totals follow in tons, with the August figures in parentheses: production, 296,961 (329,518); deliveries to customers, 267,421 (305,964); stocks at end of month, 369,610 (338,202).

Lead-Zinc Subsidy Bill

Senate approval of a House-passed measure (HR-8860) which would provide subsidy payments to small domestic producers of lead and zinc, featured developments in both of these metals. The bill has been sent to the White House. At this writing informed quarters believe the bill has a 50-50 chance of being signed into law by the President.

The measure authorizes stabilization payments to make up the difference between the market price and a price of 17.00c a pound for lead and 14.50c a pound for zinc. The bill applies only to those domestic producers who produce or sell up to 2,000 tons of lead and/or 2,000 tons of zinc annually.

Marketwise, lead has been on the quiet side. Most of the business in recent trading has been for carload lots for August shipment at the spot price of 12.00c a pound New York and 11.80c a pound St. Louis.

The zinc market also has been somewhat quieter. Consumers currently were showing interest in Special High Grade at the 1.50c a pound premium over Prime Western zinc. Little demand was noted for Prime Western zinc but the price was steady at 13.00c a pound East St. Louis.

July Zinc Statistics

July statistics for zinc (all grades) follow in tons, with the June totals in parentheses: production, 73,754 (76,723); domestic shipments, 50,002 (50,690); stocks at end of month, 207,059 (187,686).

N. J. Zinc Strike

The New Jersey Zinc Co.'s smelters at Palmerton, Pa., and Depue, Ill., and its mines at Friedenville, Pa., Austinville and Ivanhoe, Va., Treadway, Tenn., and Gilman, Colo., were struck simultaneously on August 5 by the United Steelworkers of America. In zinc industry circles it was estimated that the strike at the New Jersey Zinc properties will entail a loss in output of about 10,000 tons a month, and the strike at Bunker Hill properties has cut production there about 6,000 tons a month, a combined total of 16,000 tons.

Aluminum Price Rise

The upward revision in prices of certain aluminum fabricated prices and ingots did not come as a surprise. Aluminum Co. of America initiated such action, the upward adjustments ranging an average of 0.50c to 0.75c a pound, on August 1. Other factors in the industry shortly announced similar action.

Alcoa, meanwhile, also initiated dropping the term "pig" as a designation for primary aluminum products, due to completion of a program designed to improve the quality of aluminum produced for customers at its primary smelting locations. In the future, all primary products will be described in price data and product literature as "ingot." The change in nomenclature did not involve any reduction in price of the primary metal. The base primary price for aluminum is now 26.00c a pound for the 50-pound ingot, 99½% minimum grade.

U. S. primary aluminum production in July rose to 177,564 tons from 171,356 tons in June. Output for the first seven months of 1960 totaled 1,184,917 tons as against 1,121,593 tons in the corresponding period of 1959.

Quicksilver Eases

Spot quicksilver on August 16 was available at $308 to $210 per flask of 76 pounds, a drop of $1 from the previous range of $209-$211. Trade quarters generally indicated that supplies were on the ample side. Some factors indicated they thought the price decline was at or near its bottom.

Silver was steady at 91.375c an ounce New York. Platinum was unchanged at $81-$85 an ounce.

Daily Metal Quotations for July, 1960

The following quotations are taken from the Daily Metal Reporter*
(In Cents Per Pound)

JULY	Copper					Tin — Straits New York		Lead		Zinc					Alumi-num	Anti-mony	Silver
	Producers' Price Delivered	Custom Smelters' Price, Del.	Electro f. o. b. Refinery	Lake Del.	Aver. Prompt Electrolytic Export Price F.a.s. N. Y.	Spot	Prompt	New York	Outside St. Louis	Prime West. f. o. b. E. St. Louis	Prime West. Del. N. Y.	Brass Spec. f. o. b. E. St. Louis	High Grade Delivered	Spec. High Grade Delivered	30-Lb. Ingot 99½% Plus f. o. b.	Domestic Spot 99.5% f.o.b. Laredo	(Cents Per Ounce) New York
1	33.00	33.00	32.60	33.00	31.00	102.75	102.625	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
5	33.00	33.00	32.60	33.00	31.00	102.50	102.50	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
6	33.00	33.00	32.60	33.00	31.00	102.75	102.75	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
7	33.00	33.00	32.60	33.00	31.00	102.875	102.75	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
8	33.00	33.00	32.60	33.00	31.00	102.625	102.375	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
11	33.00	33.00	32.60	33.00	31.875	102.625	102.50	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
12	33.00	33.00	32.60	33.00	31.875	102.50	102.375	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
13	33.00	33.00	32.60	33.00	31.375	102.875	102.75	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
14	33.00	33.00	32.60	33.00	31.375	102.875	102.875	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
15	33.00	33.00	32.60	33.00	31.375	103.125	103.00	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
18	33.00	33.00	32.60	33.00	31.375	103.50	103.375	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
19	33.00	33.00	32.60	33.00	31.375	103.875	103.75	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
20	33.00	33.00	32.60	33.00	31.375	104.25	104.25	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
21	33.00	33.00	32.60	33.00	31.375	104.75	104.75	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
22	33.00	33.00	32.60	33.00	31.375	104.75	104.75	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
25	33.00	33.00	32.60	33.00	31.25	104.375	104.375	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
26	33.00	33.00	32.60	33.00	31.25	104.75	104.75	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
27	33.00	33.00	32.60	33.00	31.00	104.75	104.75	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
28	33.00	33.00	32.60	33.00	31.00	104.625	104.625	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
29	33.00	33.00	32.60	33.00	31.00	104.625	104.625	12.00	11.80	13.00	13.50	13.25	14.35	14.50	28.10	29.00	91.375
AV.	**33.00**	**33.00**	**32.60**	**33.00**	**31.263**	**103.588**	**103.525**	**12.00**	**11.80**	**13.00**	**13.50**	**13.25**	**14.35**	**14.50**	**28.10**	**29.00**	**91.375**
HI.	**33.00**	**33.00**	**32.60**	**33.00**	**32.00**	**104.75**	**104.75**	**12.00**	**11.80**	**13.00**	**13.50**	**13.25**	**14.35**	**14.50**	**28.10**	**29.00**	**91.375**
LO.	**33.00**	**33.00**	**32.60**	**33.00**	**31.00**	**102.50**	**102.50**	**12.00**	**11.80**	**13.00**	**13.50**	**13.25**	**14.35**	**14.50**	**28.10**	**29.00**	**91.375**

* When split quotations prevail the daily average price is listed. The highs and lows for the month take into consideration the levels reached at both sides of such ranges.

Copper Statistics Reported by Copper Institute

Combined Totals in U. S. A. and Outside U. S. A.

(In tons of 2,000 pounds)

	Crude Production		Refined	Deliveries to	Refined Stock	Stock Increases or Decreases		
	Primary	Secondary	Production	Customers	End of Period	Blister	Refined	Total
1957								
Total	**2,897,719**	**123,270**	**3,035,588**	**2,853,307**	**458,340**	**—14,599**	**+103,920**	**+89,321**
1958								
Total	2,713,412	138,696	2,811,108	2,918,404	262,544	+41,000	—195,796	—154,796
1959								
				(Oct. 1)	356,614			
October	184,409	10,955	181,707	210,945	330,438	+13,657	—26,176	—12,519
November	192,353	10,631	186,496	229,281	311,049	+16,388	—19,389	— 3,001
December	211,575	9,767	203,614	238,095	293,006	+17,728	—18,043	— 315
Total	2,860,454	134,583	2,926,657	2,973,026	293,006	+68,380	+28,774	+97,154
1960								
January**	259,779	13,116	257,614	272,040	304,038	+15,278	— 3,426	+11,852
February	271,765	14,578	269,952	280,656	302,351	+16,391	— 1,687	+14,704
March	307,064	12,198	303,503	307,572	300,790	+15,759	— 1,561	+14,198
April	302,268	17,477	326,403	319,037	309,357	— 6,658	+ 8,567	+ 1,909
May	301,070	17,248	323,167	321,783	312,666	— 4,849	+ 3,309	— 1,540
June	302,703	16,786	329,518	305,964	338,202	—10,029	+25,536	+15,507
July	294,648	13,584	299,427	268,191	371,306	+ 8,805	+33,104	+41,909

In U. S. A.

1957								
Total	**1,116,380**	**112,060**	**1,616,964**	**1,277,946**	**181,024**	.....	**+60,379**	.....
1958								
Total	1,008,170	131,294	1,446,540	1,179,416	80,722	.....	—100,302	.....
1959								
September	19,503	6,578	44,468	92,501	79,826	.....	—14,283	.....
				(Oct. 1)	81,514			
October	20,931	9,861	44,218	68,648	78,308	.....	— 3,206	.....
November	18,351	9,710	37,299	83,626	74,642	.....	— 3,666	.....
December	26,686	8,595	46,302	90,039	64,763	.....	— 9,879	.....
Total	805,875	121,462	1,221,612	1,312,328	64,763	.....	—17,647	.....
1960								
January	65,677	10,707	86,491	102,829	68,550	.....	+ 3,787	.....
February	85,899	12,628	105,417	111,851	64,007	.....	— 4,543	.....
March	107,514	9,166	131,308	126,776	61,598	.....	— 2,409	.....
April	104,895	14,765	153,053	129,663	63,373	.....	+ 1,775	.....
May	104,272	13,857	147,050	108,266	65,328	.....	+ 1,995	.....
June	95,522	13,585	161,073	106,207	87,667	.....	+22,339	.....
July	91,629	10,822	132,697	83,788	93,102	.....	+ 5,435	.....

Outside U. S. A.*

1957								
Total	**1,781,339**	**11,210**	**1,418,624**	**1,575,361**	**277,316**	.....	**+43,541**	.....
1958								
Total	1,705,242	7,402	1,364,568	1,738,988	181,822	.....	—95,494	.....
1959								
October	163,478	1,093	137,489	142,297	252,130	.....	—22,970	.....
November	173,902	921	149,197	145,655	236,407	.....	—15,723	.....
December	184,889	1,172	157,312	148,056	228,243	.....	— 8,164	.....
Total	2,054,579	13,121	1,705,045	1,660,698	228,243	.....	+46,421	.....
1960								
January**	194,099	2,409	171,123	169,211	235,488	.....	— 7,213	.....
February	185,866	1,950	164,535	168,805	238,344	.....	+ 2,856	.....
March	199,550	3,023	172,145	180,796	239,192	.....	+ 848	.....
April	197,373	2,712	173,350	189,374	245,984	.....	+ 6792	.....
May	195,278	3,391	174,298	210,868	247,338	.....	+ 1,354	.....
June	207,181	3,201	168,445	199,757	250,535	.....	+ 3,197	.....
July	203,019	2,762	166,730	184,403	278,204	.....	+27,669	.....

* Excludes production of Russia, Japan, Yugoslavia, Norway, Sweden, Finland, the Messina Mine in Transvaal and output of several other small producing countries from which reports are not available. Represents approximately 90 per cent of Free World.

** Starting with January, 1960, figures include production from Australia and additional production from Europe.

Electrolytic Copper

Producers' Price, Del. Valley
Monthly Average Prices
(Cents Per Pound)

	1957	1958	1959	1960
Jan.	36.00	25.69	29.00	33.00
Feb.	33.318	25.00	29.972	33.00
Mar.	32.00	25.00	31.14	33.00
Apr.	32.00	25.00	31.50	33.00
May	32.00	25.00	31.50	33.00
June	30.955	25.36	31.50	33.00
July	29.25	26.125	30.587	33.00
Aug.	28.639	26.50	30.00	...
Sept.	27.031	26.50	30.571	...
Oct.	27.00	27.548	30.75	...
Nov.	27.00	29.00	32.375	...
Dec.	27.00	29.00	33.00	...
Aver.	**30.183**	**26.31**	**30.991**	...

Electrolytic Copper

Custom Smelters' Price, Del. Valley
Monthly Average Prices
(Cents Per Pound)

	1957	1958	1959	1960
Jan.	34.87	24.577	29.429	35.00
Feb.	32.273	23.557	30.361	35.00
Mar.	30.952	23.326	33.31	33.609
Apr.	31.24	23.66	32.84	33.00
May	30.163	23.865	32.00	33.00
June	29.60	25.52	31.477	33.00
July	28.39	29.231	29.52	33.00
Aug.	27.862	26.52	30.056	...
Sept.	25.948	26.355	33.00	...
Oct.	25.722	28.577	33.00	...
Nov.	25.435	29.829	Nom.	...
Dec.	25.26	28.846	35.00	...
Aver.	**28.93**	**25.905**	**31.808**	...

Lake Copper

Producers' Price Delivered
Monthly Average Prices
(Cents Per Pound)

	1957	1958	1959	1960
Jan.	36.00	25.69	29.00	33.00
Feb.	33.182	25.00	30.00	33.00
Mar.	32.00	25.00	31.14	33.00
Apr.	32.00	25.00	31.50	33.00
May	32.00	25.00	31.50	33.00
June	30.955	25.00	31.50	33.00
July	29.25	25.75	30.587	33.00
Aug.	28.611	26.50	30.00	...
Sept.	27.00	26.50	31.107	...
Oct.	27.00	27.577	31.50	...
Nov.	27.00	29.00	32.833	...
Dec.	27.00	29.00	33.00	...
Aver.	**30.162**	**26.251**	**31.222**	...

Fabricators' Copper Statistics

(In tons of 2,000 pounds)

	Fabricators' Stocks of Refined Cop.	Unfilled Purchases of Refined by Fab. from Producers	Fabricators' Working Stocks	Unfilled Sales by Fabricators to Customers	Actual Copper Consmd. by Fabricators	Excess Fabricators' Stocks Over Orders Bkd.
1954						
Total	360,526	58,125	304,619	136,581	1,231,840	— 22,549
1955						
Total	.....	.....	.....	.....	1,418,241	.....
1956						
Total	.....	.....	.....	.....	1,416,378	.....
1957						
Sept.	425,168	80,436	344,530	144,538	106,927	+ 16,536
Oct.	420,130	80,774	341,869	138,420	119,161	+ 20,615
Nov.	428,520	68,249	345,832	128,719	98,725	+ 22,218
Dec.	430,171	75,627	347,465	138,631	83,067	+ 19,702
Total	.....	.....	.....	.....	1,279,086	.....
1958						
Jan.	445,514	57,917	348,426	123,756	94,642	+ 31,249
Feb.	452,673	52,342	351,035	128,330	86,625	+ 25,650
Mar.	448,125	71,693	346,875	141,387	83,694	+ 31,556
Apr.	450,442	76,602	347,607	145,623	79,613	+ 33,814
May	441,001	78,194	346,404	138,190	88,447	+ 34,601
June	433,526	72,383	330,301	145,162	109,011	+ 30,448
July	431,796	77,362	326,263	153,529	79,353	+ 29,366
Aug.	421,931	78,194	323,667	150,436	96,717	+ 26,022
Sept.	416,887	71,025	319,281	145,390	105,474	+ 28,941
Oct.	399,113	91,019	315,929	156,692	138,017	+ 17,511
Nov.	419,914	88,580	328,238	157,799	110,487	+ 22,457
Dec.	447,123	90,401	326,438	177,869	92,573	+ 35,217
Total	....	....	....	....	1,165,364	....
1959						
Jan.	457,387	101,182	337,761	172,698	108,556	+ 44,070
Feb.	459,046	123,321	390,522	183,113	116,565	+ 58,732
Mar.	449,441	130,785	334,904	211,547	133,259	+ 33,775
Apr.	463,582	125,250	337,282	204,618	120,680	+ 46,932
May	474,657	133,694	338,835	210,424	124,060	+ 59,092
June	492,072	111,229	343,585	191,875	133,702	+ 67,841
July	518,699	110,367	357,474	193,338	81,500	+ 68,254
Aug.	487,259	97,786	359,049	191,476	121,563	+ 34,520
Sept.	462,880	111,675	360,760	206,254	116,880	+ 7,541
Oct.	431,612	119,806	347,136	211,359	100,302	— 7,077
Nov.	412,401	127,162	338,856	224,442	102,837	— 23,735
Dec.	414,757	130,324	340,349	202,775	88,706	+ 1,957
Total	....	....	....	....	1,347,610	....
1960						
Jan.	414,652	141,860	340,233	193,300	102,295	+ 22,979
Feb.	423,131	132,696	343,196	165,991	103,072	+ 46,640
Mar.	441,026	119,963	348,081	134,461	108,881	+ 78,447
Apr.	457,070	99,814	357,711	111,062	113,619	+ 88,111
May	457,644	85,491	360,770	117,150	107,838	+ 65,215
June	451,982	90,527	364,301	132,070	112,223	+ 46,138
July	459,871	87,798	372,186	126,674	75,399	+ 48,809

Scrap Copper Receipts by Custom Smelters and Refineries in United States*

(In Short Tons)

	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Jan.	6,640	4,528	6,486	9,859	11,047	14,322	17,506	16,024	14,511	15,165
Feb.	5,153	3,633	10,337	8,490	15,198	14,497	11,145	9,518	14,712	14,614
Mar. ...	7,912	5,243	19,991	9,738	12,198	15,921	13,934	11,783	19,522	11,675
Apr.	8,553	6,214	16,583	9,004	13,162	17,233	14,288	15,279	17,525	17,543
May	8,458	8,033	10,857	8,687	15,133	20,805	12,397	13,989	13,960	16,497
June ...	8,628	4,425	10,945	13,309	14,765	14,758	11,949	13,945	15,065	15,769
July	6,642	5,188	9,063	10,260	9,988	12,632	8,926	12,185	11,144	12,609
Aug.	6,113	5,003	7,137	10,100	12,197	12,510	11,645	11,896	7,468	....
Sept. ...	3,561	4,667	9,042	10,641	15,037	9,518	9,756	9,268	10,070	....
Oct.	3,336	4,602	10,065	11,662	12,897	15,570	13,151	23,088	12,860	....
Nov.	3,179	4,724	7,815	10,879	9,865	11,369	11,146	16,425	11,773	....
Dec.	4,538	6,208	11,476	14,876	13,180	14,613	11,237	10,796	10,894	....
Total ..	71,812	62,470	129,798	127,449	154,714	173,748	147,080	164,196	159,507	....

* As compiled by Copper Institute.

Brass and Bronze Ingot Monthly Shipments

(NET TONS)

The following figures showing the combined shipments of ingot brass and bronze are compiled by the Ingot Brass and Bronze Industry and represent in excess of 95 per cent of the deliveries of the entire industry.

	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960
Jan.	18,874	28,416	28,315	23,423	20,661	25,201	27,736	25,681	20,468	22,046	22,695
Feb.	18,487	27,168	24,211	25,429	19,920	25,349	24,949	20,769	17,413	23,746	23,129
Mar.	22,494	31,997	23,890	28,256	23,653	29,713	28,310	21,948	18,825	26,109	23,232
Apr.	22,118	30,473	22,547	25,044	24,746	27,641	25,808	23,507	18,009	26,115	20,413
June	25,093	33,817	21,274	20,818	22,348	23,141	18,842	18,888	17,962	22,922	19,625
July	21,609	32,016	18,947	19,321	17,074	18,513	17,364	16,695	16,658	20,346	14,587
Aug.	29,689	25,285	21,807	20,156	21,684	27,013	23,812	19,654	17,882	21,741	....
Sept.	28,811	22,285	22,770	21,463	22,464	26,349	20,929	19,670	20,540	22,685	....
Oct.	32,240	23,124	25,811	22,280	24,080	25,228	23,045	22,800	23,225	23,067	....
Nov.	31,748	23,544	23,441	21,806	23,061	25,102	21,818	19,767	20,758	22,283	....
Dec.	28,575	20,987	22,983	20,541	21,274	21,448	18,046	16,875	18,676	19,535	....
Total 303,563		332,378	277,736	271,251	263,233	298,406	274,096	248,297	227,607	274,562	....
Aver.	25,297	27,615	23,145	22,694	21,936	24,867	22,841	20,681	18,133	22,864	....

Mine Production of Copper in United States

(U. S. Bureau of Mines)
(In short tons)

	Eastern	Missouri	Western	Total
1957				
Ttl.	79,369	1,800	995,753	1,076,922
1958				
Dec.	6,614	70	88,070	94,514
Ttl.	76,849	1,250	902,021	980,304
1959				
Feb.	5,883	130	81,849	87,862
Mar.	6,513	140	91,681	98,334
Apr.	7,240	150	93,209	100,599
May	7,007	110	94,493	101,610
June	7,245	124	87,035	94,404
July	6,763	111	80,058	86,932
Aug.	6,813	116	47,910	54,839
Sept.	6,655	123	20,342	27,120
Oct.	7,092	152	22,669	29,913
Nov.	3,226	140	22,529	25,895
Dec.	3,228	128	22,504	25,860
Ttl.	74,255	1,550	754,630	830,435
1960				
Jan.	3,904	107	43,845	47,856
Feb.	3,819	114	71,257	75,190
Mar.	7,229	96	88,931	96,256
Apr.	7,149	97	90,288	97,534
May	7,530	77	91,152	98,759
June	7,296	97	88,208	95,601

Average Custom Smelters' Scrap Buying Prices

(Cents per pound for carload lots del. consumers' works)

	No. 1 Copper Scrap	No. 2 Copper Scrap	Light Copper Scrap	Refinery Brass*
1958				
Aver	21.788	20.282	18.035	18.047
1959				
June	26.80	25.30	23.05	24.80
July	25.14	23.64	21.39	23.14
Aug.	25.762	24.762	22.012	23.762
Sept.	26.369	24.869	22.319	24.369
Oct.	27.929	25.405	23.155	24.905
Nov.	30.00	26.208	23.958	24.528
Dec.	29.50	25.993	23.743	24.239
Av.	27.321	25.377	23.102	24.774
1960				
Jan.	30.025	26.30	24.05	24.55
Feb.	29.868	25.75	23.50	24.00
Mar.	27.207	24.038	21.788	22.071
Apr.	27.063	24.256	22.006	22.256
May	26.548	24.369	22.119	22.368
June	26.557	24.455	22.205	22.455
July	27.575	25.075	22.825	23.075

*Of dry content for material having a dry copper content in excess of 40%.

Brass Ingot Makers' Scrap Copper Buying Prices

(Average Prices)
(Cents per pound del. refinery for 60,000 lbs. of each grade)

	No. 1 Copper Scrap	No. 2 Copper Scrap	No. 1 Composition	Heavy Yellow Brass
1958				
Aver.	21.777	20.277	18.653	13.024
1959				
June	26.80	25.30	21.159	15.307
July	25.14	23.64	20.13	14.47
Aug.	25.762	24.262	21.286	14.81
Sept.	26.369	24.869	22.304	16.50
Oct.	27.595	25.405	22.19	16.048
Nov.	29.00	26.208	22.75	16.326
Dec.	28.50	25.993	22.50	16.00
Av.	27.120	25.377	21.567	15.52
1960				
Jan.	29.025	26.30	22.74	16.39
Feb.	28.408	25.75	22.00	16.00
Mar.	27.321	24.038	20.429	15.174
Apr.	27.063	24.256	20.613	15.15
May	26.548	24.369	20.613	15.083
June	26.715	24.455	20.25	15.193
July	27.375	25.075	21.075	15.875

Lead Statistics Reported by American Bureau of Metal Statistics

Lead Refineries in U. S. A. and Outside U. S. A.

(Recoverable Lead Content in Tons of 2,000 Pounds)

Combined U. S. A. and Outside U. S. A.

	REFINED PRODUCTION			DELIVERIES			STOCKS		
	Pig	Antimonial Lead Content	Total	Pig	Antimonial Lead Content	Total	Pig	Antimonial Lead Content	Total
1958									
Total ..	1,485,282	106,383	1,591,665	1,307,390	102,697	1,410,087	.....	.....	.....
1959									
Dec. ..	121,374	8,444	129,818	118,582	4,107	122,689	272,269	20,511	292,780
Total ..	1,406,485	105,943	1,512,418	1,422,985	106,666	1,529,651	.....	.....	.....
1960									
Jan. ..	131,753	9,395	141,148	124,705	7,413	132,118	*281,530	*20,280	301,810
Feb. ..	127,595	8,977	136,572	121,803	9,539	131,342	287,322	19,719	307,041
Mar. ..	128,203	8,490	136,693	122,013	8,327	130,340	293,512	19,882	313,394
Apr. ..	137,979	7,574	145,553	107,128	7,691	114,819	324,400	19,765	344,165
May ..	130,426	11,126	141,552	125,126	8,556	133,682	329,700	22,335	352,035
June ..	117,093	8,181	125,274	112,699	9,361	122,060	334,094	21,155	355,249
U. S. A.									
1958									
Total ..	473,208	46,985	520,193	589,528	49,893	639,421	.....	.....	.....
1959									
Dec. ..	27,969	2,052	30,021	41,502	1,745	39,757	154,307	11,552	165,859
Total ..	343,726	34,628	378,354	596,214	42,312	638,526	.....	.....	.....
1960									
Jan. ..	37,497	2,414	39,911	49,498	2,304	51,802	156,215	12,257	168,472
Feb. ..	33,742	2,570	36,312	56,569	2,659	59,228	152,299	12,464	164,763
Mar. ..	35,018	2,070	37,088	40,536	2,289	42,825	158,023	12,399	170,422
Apr. ..	37,465	2,186	39,651	36,572	2,267	38,839	164,875	12,514	177,389
May ..	33,474	3,296	36,770	47,433	2,664	50,097	170,208	13,426	183,634
June ..	31,188	2,094	33,282	46,349	2,921	49,270	170,283	12,837	183,120
Outside U. S. A.									
1958									
Total ..	1,012,074	59,398	1,071,472	717,862	52,804	710,666	.....	.....	.....
1959									
Dec. ..	93,405	6,392	99,797	77,080	5,852	82,932	117,962	8,959	126,921
Total ..	1,062,759	71,315	1,134,074	826,771	64,453	891,125	.....	....	.....
1960									
Jan. ..	94,256	6,981	101,237	75,207	5,109	80,316	*125,315	*8,023	133,338
Feb. ..	93,853	6,407	100,260	65,234	6,880	72,114	135,023	7,255	142,278
Mar. ..	93,185	6,420	99,605	81,477	6,038	87,515	135,489	7,483	142,972
Apr. ..	100,514	5,388	105,902	70,556	5,424	75,980	159,525	7,251	166,776
May ..	96,952	7,830	104,782	77,693	5,892	83,585	159,492	8,909	168,401
June ..	85,905	6,087	91,992	66,350	6,440	72,790	163,811	8,318	172,129

* Stocks on Jan. 1, 1960 are not comparable to those reported for Dec. 31, 1959 due to changes in the basis by reporting areas.

Summary of Lead Statistics for United States

Recoverable Lead Content In Tons of 2000 Pounds	Stocks (end of period) — Raw Material at Smelter	Base Bullion — At Smelter & Transit	Base Bullion — At Refinery and Process	Refined Pig and Antimonial	Total	Smelter Receipts — Primary Origin — U.S.A.	Primary Origin — Outside U.S.A.	Scrap	Total
1958									
Total	....	....	....	.....	.....	297,687	191,415	29,080	518,182
1959									
October ...	66,942	7,285	24,758	176,119	275,194	15,837	4,959	1,049	21,845
November ..	70,376	3,617	27,335	165,611	266,939	13,956	5,599	649	20,204
December ..	70,036	4,594	35,288	165,859	275,777	20,125	10,013	2,621	32,759
Total	.....	....	.....	.....	.....	244,803	125,100	20,596	389,999
1960									
January ...	78,131	4,003	37,013	168,472	287,619	21,094	26,442	1,900	49,436
February ...	86,087	2,680	36,748	164,763	290,278	24,719	15,822	2,136	42,677
March	93,108	5,029	36,866	170,422	305,425	29,979	17,105	2,128	49,212
April	89,421	3,639	39,950	177,389	310,399	27,863	9,264	2,207	39,334
May	98,470	4,402	36,979	183,634	323,485	22,537	17,959	2,048	42,544
June	95,364	5,210	39,928	183,120	323,622	20,895	11,717	1,337	33,949

	Smelter Production	Refined Productions — Pig	Refined Productions — Antimonial	Refined Productions — Total	Deliveries to U. S. Fabricators including imports from sources reporting to ABMS — Pig	Antimonial	Total
1958							
Total	512,323	473,208	46,985	520,193	589,528	49,893	639,421
1959							
October	16,315	18,096	697	18,793	35,110	2,290	37,400
November	16,770	17,785	854	18,639	42,000	2,038	44,038
December	32,676	27,969	2,052	30,021	41,507	1,745	39,757
Total	381,656	343,726	34,628	378,354	596,214	42,312	638,526
1960							
January	40,593	37,497	2,414	39,911	49,498	2,304	51,802
February	34,326	33,742	2,570	36,312	56,569	2,659	59,228
March	41,673	35,018	2,070	37,088	40,536	2,289	42,825
April	42,436	37,465	2,186	39,651	36,572	2,267	38,839
May	33,106	33,474	3,296	36,770	47,433	2,264	50,097
June	36,525	31,188	2,094	33,282	46,349	2,921	49,270

United States Lead Statistics of Primary Refineries

(American Bureau of Metal Statistics)
(In tons of 2,000 lbs.)

	Stock At Beginning	Production Primary & Secondary	Total Supply	Stock At End	Domestic Shipments
1954	81,152	551,618	632,770	92,719	475,551
1955	28,855	547,153	639,872	31,089	531,339
1956	.....	613,293	644,382	.....	529,484
1957	.....	604,353	645,534	.....	463,060
1958					
November	169,435	40,485	209,920	179,321	30,591
December	179,321	44,042	223,363	198,538	24,852
Total	....	522,956	614,554	....	380,359
1959					
January	198,508	43,652	242,160	208,874	33,035
February	208,874	39,498	248,372	214,946	30,685
March	214,946	39,238	254,184	210,524	40,980
April	210,524	40,606	251,130	197,823	52,469
May	197,823	39,101	236,924	171,577	65,207
June	171,577	37,459	209,036	133,235	75,465
July	133,235	32,882	166,117	142,694	22,380
August	142,694	25,589	168,283	124,259	43,850
September	124,259	14,801	139,060	117,296	21,795
October	117,296	18,892	136,188	115,418	20,552
November	115,418	18,796	134,214	114,303	19,869
December	114,303	30,160	144,463	119,993	24,516
Total	....	380,674	579,182	....	450,983
1960					
January	119,993	40,043	160,036	117,589	42,083
February	117,589	36,435	154,024	116,269	37,599
March	116,269	37,192	153,461	109,148	44,076
April	109,148	40,177	149,325	118,329	30,686
May	118,329	36,509	154,838	123,148	31,690
June	123,148	33,448	156,596	129,859	26,725

In instances where the figures are not in balance it is due to shipments to other than domestic consumers.

Industrial Classification of Domestic Lead Shipments

(American Bureau of Metal Statistics) (In tons of 2,000 lbs.)

	Cable	Amm.	Foil	Batt'y	Brass Making	Sundries	Jobbers	Unclassified
1955								
Total	72,418	27,599	2,622	88,461	3,960	52,994	13,034	270,251
1956								
Total	80,360	24,501	1,435	70,614	3,158	56,851	13,213	274,716
1957								
Total	58,444	25,452	1,691	64,761	7,420	53,284	11,127	240,881
1958								
Feb.	2,899	1,750	70	5,124	90	1,643	888	11,368
Mar.	3,133	1,200	35	4,711	681	3,149	908	15,068
April	3,207	900	70	3,138	580	2,831	533	10,913
May	3,216	1,850	35	4,671	866	3,071	1,027	15,285
June	3,463	1,950	35	2,767	480	4,217	1,716	17,450
July	3,169	1,250	275	3,936	515	4,157	1,052	17,594
Aug.	3,481	2,415	70	4,992	400	6,399	100	16,397
Sept.	4,132	2,290	320	5,775	848	6,771	1,747	19,774
Oct.	3,243	2,450	...	4,548	285	6,210	1,641	28,270
Nov.	3,690	2,150	50	6,527	360	4,887	822	12,105
Dec.	2,267	2,100	50	6,216	215	2,578	652	10,774
Total	38,838	20,855	1,080	57,180	5,841	51,086	11,882	193,592
1959								
Jan.	2,284	2,100	100	5,594	161	3,545	727	18,524
Feb.	2,988	1,225	50	5,254	735	2,706	931	16,796
Mar.	3,156	1,850	105	5,905	378	6,006	2,185	21,395
April	3,686	2,150	35	7,410	691	5,356	1,966	31,355
May	4,054	2,900	35	6,870	475	7,990	2,843	40,040
June	5,272	3,210	70	12,515	180	8,009	3,663	42,546
July	850	295	70	2,570	315	3,166	997	14,117
Aug.	3,268	1,150	205	3,073	410	6,640	1,921	27,183
Sept.	1,003	....	35	3,401	255	2,296	1,484	13,321
Oct.	700	500	35	4,299	228	2,676	1,021	11,093
Nov.	2,630	200	70	3,714	205	2,566	797	9,687
Dec.	2,133	950	70	3,479	475	2,628	738	14,043
Total	32,024	16,530	880	64,084	4,508	53,584	19,273	260,100
1960								
Jan.	2,138	3,352	105	3,268	550	4,786	1,106	26,778
Feb.	2,665	2,350	50	4,930	295	3,715	574	23,020
Mar.	2,221	1,500	...	8,195	1,050	8,298	2,133	20,679
Apr.	2,005	2,707	83	2,891	380	5,180	916	16,519
May	2,327	1,000	35	4,516	115	4,526	927	18,244
June	2,665	1,500	70	5,043	230	714	690	15,813

Lead Prices at New York

(Common Grade)
Monthly Average Prices
(Cents Per Pound)

	1957	1958	1959	1960
Jan.	16.00	13.00	12.619	12.00
Feb.	16.00	13.00	11.583	12.00
Mar.	16.00	13.00	11.42	12.00
Apr.	16.00	12.00	11.20	12.00
May	15.385	11.712	11.905	12.00
June	14.32	11.24	12.00	12.00
July	14.00	11.00	12.00	12.00
Aug.	14.00	10.85	12.286	...
Sept.	14.00	10.89	13.00	...
Oct.	13.704	12.673	13.00	...
Nov.	13.50	13.00	13.00	...
Dec.	13.00	13.00	12.523	...
Aver.	14.66	12.114	12.211	...

Lead Sheet Prices

(To Jobbers, Full Sheets)
Monthly Average Prices
(Cents Per Pound)

	1957	1958	1959	1960
Jan.	21.50	18.50	18.119	17.50
Feb.	21.50	18.50	17.083	17.50
Mar.	21.50	18.50	16.92	17.50
Apr.	21.50	17.50	16.70	17.50
May	20.885	17.212	17.405	17.50
June	19.82	16.74	17.50	17.50
July	19.82	16.50	17.50	17.50
Aug.	19.50	16.35	17.786	...
Sept.	19.50	16.39	18.50	...
Oct.	19.204	18.173	18.50	...
Nov.	19.00	18.50	18.50	...
Dec.	18.50	18.50	18.023	...

Battery Shipments

The following table shows replacement battery shipments in the United States as compiled by the Business Information Division of Dun & Bradstreet, Inc., for the Association of American Battery Manufacturers:

(In thousands of units)

	1957	1958	1959	1960
Jan.	2,638	2,004	2,672	1,866
Feb.	1,961	1,803	1,791	1,641
Mar.	1,254	1,577	1,376	1,877
Apr.	1,178	1,242	1,437	1,545
May	1,605	1,454	1,593	1,650
June	1,878	1,773	2,118	1,926
July	2,469	2,101	2,556	....
Aug.	2,856	2,333	2,728	....
Sept.	2,688	2,704	2,889	....
Oct.	3,042	2,976	3,069	....
Nov.	2,359	2,262	2,799	....
Dec.	2,015	3,041	2,465	....
Total	25,943	25,270	27,493	....

Lead Stocks at Primary U. S. Smelters and Refiners

(American Bureau of Metal Statistics)
(In tons of 2,000 lbs.)

	In ore and matte and in process at smelteries	—In base bullion (lead content)— At smelteries & refineries	In transit to refineries	In process at refineries	Refined pig lead	Anti-monial lead	Total Stocks
1958							
Apr. 1..	83,185	10,692	2,187	21,766	116,610	12,144	246,584
May 1..	86,053	11,838	2,138	20,524	130,668	12,468	263,689
June 1..	79,482	11,059	2,010	20,188	141,967	13,154	267,860
July 1..	80,060	9,012	1,570	22,092	150,648	12,856	276,238
Aug. 1..	83,347	12,438	860	21,615	154,378	10,482	283,379
Sept. 1.	77,416	14,767	1,176	20,444	158,413	10,889	283,105
Oct. 1..	72,724	14,797	2,223	18,125	159,662	11,004	278,535
Nov. 1..	61,819	11,492	1,086	19,041	157,385	12,050	262,873
Dec. 1..	62,960	11,072	1,565	20,941	167,493	11,828	275,859
1959							
Jan. 1..	72,378	10,917	1,767	19,746	185,913	12,595	303,316
Feb. 1..	72,832	10,565	1,889	21,317	197,085	11,789	315,477
Mar. 1..	62,383	11,707	1,447	21,479	202,835	12,111	311,962
Apr. 1..	68,433	14,352	350	20,575	198,459	12,065	314,234
May 1..	64,538	12,373	624	20,507	184,468	13,355	295,865
June 1..	55,223	12,239	766	20,391	157,981	13,596	260,196
July 1..	58,451	13,270	943	19,468	120,914	12,321	225,367
Aug. 1..	53,115	18,379	158	18,021	129,551	13,143	232,367
Sept. 1.	50,007	17,389	....	15,638	116,344	7,915	207,293
Oct. 1..	61,910	17,925	....	14,932	109,527	7,769	212,063
Nov. 1..	69,429	14,800	...	14,919	107,849	7,569	214,566
Dec. 1..	70,837	12,919	...	15,708	106,678	7,625	213,767
1960							
Jan. 1..	73,381	16,955	3,085	16,914	108,002	11,991	230,328
Feb. 1..	78,315	17,139	1,425	19,003	105,292	12,297	233,471
Mar. 1..	89,656	14,899	1,643	19,360	103,615	12,654	241,827
Apr. 1..	96,716	17,043	867	20,603	96,469	12,679	244,377
May 1..	92,969	16,519	1,581	22,124	105,498	12,831	251,522
June 1..	102,454	12,444	889	24,237	109,270	13,878	263,172
July 1..	99,230	15,371	1,461	24,600	116,638	13,221	270,521

Receipts of Lead in Ore and Scrap

By U. S. Smelters (a)

(American Bureau of Metal Statistics) (In tons of 2,000 lbs.)

	—Receipts of lead in ore— United States	Foreign	Total	Receipts of lead in scrap etc. (b)	Total receipts in ore, & scrap
1953 Total	351,183	155,788	506,971	42,994	549,965
1954 Total	336,291	158,081	494,372	49,864	544,236
1955 Total	341,595	172,966	514,561	42,996	557,557
1956 Total	368,499	192,318	560,817	55,925	616,792
1957 Total	356,409	206,901	563,310	42,537	605,847
1958					
April	25,104	15,821	40,925	1,913	42,838
May	27,427	10,228	37,655	1,867	39,522
June	28,577	13,811	42,388	1,366	43,754
July	22,289	19,692	41,891	1,615	43,596
August	22,984	13,043	36,027	1,252	37,279
September	20,654	14,576	35,230	1,765	36,995
October	18,678	9,093	27,771	3,577	31,348
November	24,024	14,541	38,565	3,933	42,498
December	24,366	18,804	43,170	3,982	47,152
Total	285,164	188,144	473,308	30,115	503,423
1959					
January	24,304	19,449	43,753	3,138	46,891
February	22,253	8,660	30,913	1,747	32,660
March	21,897	21,012	42,909	1,328	44,237
April	22,339	10,998	33.337	1,196	34,533
May	21,645	5,202	26,847	1,930	28,777
June	23,634	12,368	36,002	2,431	38,433
July	19,165	11,695	30,860	2,199	33,059
August	19,971	2,821	22,792	1,009	23,801
September	13,591	3,465	17,056	32	17,088
October	14,740	3,648	18,388	133	18,521
November	13,808	4,582	18,390	133	18,523
December	21,208	20,977	42,185	5,269	47,454
Total	238,555	124,877	363,432	20,545	383,977
1960					
January	20,531	26,307	46,838	2,041	48,879
February	23,700	15,541	39,241	2,439	41,680
March	28,824	16,742	45,566	2,404	47,970
April	26,574	9,243	35,817	2,212	38,029
May	21,674	16,679	38,353	2,812	41,165
June	20,248	11,694	31,942	2,580	34,522

(a) Receipts of lead in ore are computed on the basis of recoverable lead. Owing to the estimational factor in this, which is probably on the low side, and also to the possibility that some lead receipts may escape attention, these monthly totals probably underrun the actual production of pig lead. (b) Inclusive only of scrap smelted in connection with ore, plus some scrap received by primary refiners.

N. Y. Lead Price Changes

(Effective Date)

1951		Apr. 12	14.00
Oct. 2	**19.00	June 2	14.25
1952		June 15	14.00
Apr. 29	18.00	Aug. 25	14.25
May 2	17.00	Sept. 7	14.50
May 12	15.00	Sept. 15	14.75
June 23	15.50	Oct. 4	14.875
June 24	16.00	Oct. 5	15.00
Oct. 7	15.00	1955	
Oct. 14	14.00	Sept. 23	15.00-15.50
Oct. 22	13.50	Sept. 26	15.50
Nov. 3	14.00	Dec. 29	16.00
Nov. 10	14.20	1956	
Nov. 11	14.50	Jan. 4	16.50
Nov. 20	14.25	Jan. 13	16.00
Nov. 24	14.00	1957	
Dec. 22	14.25	May 9	15.50
Dec. 29	14.50	May 16	15.00
Dec. 31	14.75	June 11	14.00
1953		Oct. 14	13.50
Jan. 7	14.50	Dec. 2	13.00
Jan. 12	14.00	1958	
Feb. 2	13.50	Apr. 1	12.00
Mar. 4	13.00	May 14	11.50
Mar. 10	13.50	June 3	11.00
Apr. 7	13.00	June 18	11.50
Apr. 16	12.50	July 1	11.00
Apr. 21	12.00	Aug. 13	10.75
Apr. 29	12.50	Sept. 17	11.00
May 18	12.75	Sept. 30	11.50
May 19	13.00	Oct. 2	12.00
May 26	13.15	Oct. 8	12.50
June 11	13.50	Oct. 14	13.00
July 20	13.75	1959	
July 23	14.00	Jan. 21	12.00
Sept. 16	13.50	Feb. 11	11.50
1954		Feb. 24	11.00
Jan. 18	13.00	Mar. 5	11.50
Feb. 18	12.50	April 1	11.00
Mar. 9	12.75	April 20	11.50
Mar. 10	13.00	May 7	12.00
Mar. 26	13.25	Aug. 24	13.00
Mar. 29	13.50	Dec. 14	12.50
Apr. 1	13.75	Dec. 21	12.00

**OPS Ceiling.

Antimonial Lead Stocks at Primary Refineries

(A.B.M.S.)

(In tons of 2,000 pounds)

End of	1957	1958	1959	1960
Jan.	10,487	12,689	11,789	12,297
Feb.	10,220	12,309	12,111	12,654
Mar.	5,091	3,527	4,098	2,332
Apr.	9,391	12,468	13,355	12,831
May	9,799	13,154	13,596	13,878
June	9,503	12,856	12,321	13,221
July	8,661	10,482	13,143	....
Aug.	9,553	10,889	7,915	....
Sept.	10,215	11,004	7,769	....
Oct.	11,581	12,050	7,569	....
Nov.	11,119	11,828	7,625	....
Dec.	11,857	12,595	11,991	....

Antimonial Lead Production by Primary Refineries

(A.B.M.S.)

(In tons of 2,000 pounds)

End of	1957	1958	1959	1960
Jan.	5,114	3,743	3,541	2,538
Feb.	5,468	3,657	4,415	2,694
Mar.	9,794	12,144	12,065	12,679
Apr.	6,183	3,655	5,533	2,291
May	6,978	4,827	4,616	3,456
June	4,466	3,992	5,671	2,260
July	5,372	2,775	2,784	....
Aug.	7,967	5,244	2,185	....
Sept.	7,574	4,761	102	....
Oct.	6,148	5,849	886	....
Nov.	3,791	3,913	1,324	....
Dec.	3,290	4,539	2,656	....
Total	67,541	50,482	37,813	....

Lead Imports and Exports By Principal Countries

(A.B.M.S.)

Reported in pigs, bars, etc.; metric tons except where otherwise noted.

	1960		
	Feb.	Mar.	Apr.
IMPORTS			
U. S.* (s.t.)	15,511	17,727	19,706
Belgium	1,032	...	...
Denmark	405	1,514	1,133
France	6,049	5,948	3,555
Germany, W.‡	4,660	5,721	...
Italy††	1,279	...	...
Netherlands	2,863	2,908	2,118
Norway	417	229	...
Sweden	725	876	704
Switzerland	1,534	1,592	1,062
U. K. (l.t.)	13,052	16,125	22,979
India† (l.t.)	1,658	1,462	1,746
EXPORTS			
U. S.* (s.t.)	6	40	84
Canada (s.t.)	6,692	11,216	5,407
Belgium	4,950	...	...
Denmark	620	480	315
France	767	781	44
Germany, W.‡	2,188	2,227	...
Italy††	2	...	...
Netherlands	477	706	365
Sweden	119	100	91
Northern Rhodesia† (l.t.)	1,376	1,357	634
Australia (l.t.)	11,260	8,933	4,619

† British Bureau of Non-Ferrous Metal Statistics.
* Refined.
‡ Includes scrap.
†† Includes lead alloys.

French Lead Imports

(A. B. M. S.)

(In metric tons)

	1960		
	Apr.	May	June
Ore (gross Weight)	9,576	8,111	7,356
Algeria	1,752	...	...
Morocco	7,824	8,111	5,355
Other countries	...	...	2,001
Pig lead	3,555	8,454	3,059
United States	...	254	...
Peru	406	...	...
Belgium	490	...	685
Germany (W.)	795	1,380	275
Spain	...	...	100
U. Kingdom	...	1,086	...
Algeria	2	1	564
Morocco	801	3,360	385
Tunisia	1,061	2,093	644
Australia	...	280	...
Other countries	...	...	406
Antimonial lead	...	...	330

U. K. Lead Imports

(British Bureau of Non-Ferrous Metal Statistics)

(In tons of 2,240 lbs.)

	1960		
	Apr.	May	June
(Gross Weight) Lead and lead alloys	22,979	13,075	15,490
Australia	14,202	5,616	3,573
Canada	5,397	2,440	4,892
Peru	824	875	700
Other countries	2,556	4,144	6,325

IT PAYS
to
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in the
DAILY METAL REPORTER

U. S. Lead Consumption

(Bureau of Mines — In Short Tons)

	1960		
Metal Products:	Jan.-May	Apr.	May
Ammunition	18,906	3,875	3,936
Bearing metals	9,504	1,676	1,835
Brass and bronze	9,303	1,560	1,664
Cable covering	26,412	5,025	4,637
Calking lead	26,606	5,570	5,357
Casting metals	2,924	535	490
Collapsible tubes	3,303	677	697
Foil	1,555	403	308
Pipes, traps, and bends	9,681	1,831	2,039
Sheet lead	11,105	2,153	2,529
Solder	25,156	4,768	4,842
Storage battery grids, posts, etc.	70,742	13,127	14,332
Storage battery oxides	73,925	13,387	16,403
Terne metal	1,005	180	211
Type metal	11,092	2,150	2,188
Total	**301,219**	**56,917**	**61,468**
Pigments:			
White lead	3,209	830	798
Red lead and litharge	33,985	6,240	6,358
Pigment colors	5,228	1,005	1,187
Other*	991	233	186
Total	**43,413**	**8,308**	**8,529**
Chemicals:			
Tetraethyl lead	68,558	13,059	15,707
Miscellaneous chemicals	727	245	197
Total	**69,285**	**13,304**	**15,904**
Miscellaneous uses:			
Annealing	2,144	366	448
Galvanizing	612	83	88
Lead plating	31	6	9
Weights and ballast	3,154	721	678
Total	**5,941**	**1,176**	**1,223**
Other uses unclassified	7,783	1,670	1,697
Total reported†	**427,641**	**81,375**	**88,821**
Estimated unreported consumption	10,000	2,000	2,000
Grand total†	**437,600**	**83,400**	**90,800**
Daily average‡	**2,879**	**2,780**	**2,929**

* Includes lead content of leaded zinc oxide production.
† Includes lead content of scrap used directly in fabricated products.
‡ Based on number of days in month without adjustment for Sundays and holidays.

U. K. Lead Consumption

(British Bureau of Non-Ferrous Metal Statistics)

(In tons of 2,240 pounds)

	1958	1959	1960
Jan.	29,607	28,872	31,745
Feb.	27,855	25,968	30,241
Mar.	29,713	26,691	35,066
Apr.	26,230	29,252	28,148
May	28,839	27,280	33,459
June	28,624	30,099	33,318
July	27,201	26,851	...
Aug.	21,726	25,358	...
Sept.	28,829	30,255	...
Oct.	31,356	32,926	...
Nov.	27,786	32,579	...
Dec.	27,154	31,772	...
Total	**335,920**	**345,903**	

American Antimony

Monthly Average Prices
In bulk, f.o.b. Laredo
(Cents per lb. in ton lots)

	1957	1958	1959	1960
Jan.	33.00	33.00	29.00	29.00
Feb.	33.00	30.818	29.00	29.00
Mar.	33.00	29.00	29.00	29.00
Apr.	33.00	29.00	29.00	29.00
May	33.00	29.00	29.00	29.00
June	33.00	29.00	29.00	29.00
July	33.00	29.00	29.00	29.00
Aug.	33.00	29.00	29.00	...
Sept.	33.00	29.00	29.00	...
Oct.	33.00	29.00	29.00	...
Nov.	33.00	29.00	29.00	...
Dec.	33.00	29.00	29.00	...
Aver.	**33.00**	**29.485**	**29.00**	...

Consumers' Lead Stocks, Receipts and Consumption

(Bureau of Mines — In Short Tons)

	Stocks April 30, 1960	Net Receipts In May	Consumed In May	Stocks May 31, 1960
Soft lead	77,237	58,586	60,382	75,441
Antimonial lead	42,081	22,950	20,414	44,617
Lead in alloys	7,099	3,751	3,565	7,285
Lead in copper-base scrap	889	1,281	1,321	849
Total	127,306	86,568	*85,682	128,192

* Excludes 2,988 tons of lead which went directly from scrap to fabricated products and 151 tons of lead contained in leaded zinc oxide production.

Consumption of Lead by Class of Product

(Bureau of Mines — In Short Tons)

MAY

	Soft lead	Antimonial lead	Lead in alloys	Lead in copper-base scrap	Total
Metal products	34,030	19,688	3,484	1.321	58,523
Pigments	8,343	35	....	....	8,378
Chemicals	15,904	....	....	....	15,904
Miscellaneous	664	559	....	....	1,223
Unclassified	1,441	132	81	....	1,654
Total	60,382	20,414	3,565	1.321	*85,682

* Excludes 2,988 tons of lead which went directly from scrap to fabricated products and 151 tons of lead contained in leaded zinc oxide production.

Domestic Zinc Statistics

American Zinc Institute

Commencing with January, 1948, all regularly operating U. S. primary and secondary smelters are included in this report. Production from foreign ores also is included.

(Tons of 2,000 lbs.)

	Stock Beginning	Production	Shipments: Domestic	Export & Drawback	Gov't Acc't	Total	Stock at End	Daily Avg. Prod.
1950 Tl.	94,221	910,354	849,246	18,189	128,256	995,691	8,884	2,494
1950 Mo. Avg.		75,863	70,770	1,516	10,688	82,974		
1951 Total	8,884	931,833	836,800	42,067	39,949	918,816	21,901	2,553
1951 Mo. Avg.		77,653	69,733	3,506	3,329	76,568		
1952 Total	21,901	961,430	803,343	56,202	36,626	896,171	87,160	2,627
1952 Mo. Avg.		80,119	66,945	4,683	3,052	74,681		
1953 Total	87,160	971,191	818,850	16,326	42,332	877,508	180,843	2,661
1953 Mo. Avg.		80,933	68,238	1,361	3,528	73,126		
1954 Total	180,843	868,242	787,922	27,929	108,957	924,808	124,277	2,379
1954 Mo. Avg.		72,353	65,660	2,327	9,080	77,067		
1955 Total	40,979	1,031,018	1,007,619	19,497	87,200	1,114,316	40,979	2,825
1955 Mo. Avg.		85,918	83,968	1,625	7,267	92,860		
1956 Total		1,062,954	869,270	9,027	157,014	1,035,311	63,622	2,904
1956 Mo. Avg.		88,850	72,439	752	13,085	86,275		
1957 Total		1,067,450	765,132	15,460	179,466	815,567		
1958								
June	240,670	66,967	54,487	171	....	54,658	252,979	2,232
July	252,979	65,119	60,312	55	....	60,187	257,911	2,101
August	257,911	62,927	68,718	591	....	69,309	251,529	2,030
September	251,529	63,705	76,905	213	....	77,118	238,116	2,124
October	238,116	65,304	93,018	226	....	93,224	210,176	2,107
November	210,176	65,174	83,394	212	....	83,606	191,744	2,172
December	191,744	75,503	76,862	148	....	77,010	190,237	2,432
1958 Total		828,902	767,755	3,102	34,488	805,325	....	....
1959								
January	190,237	76,481	70,770	171	....	70,941	195,777	2,467
February	195,777	71,174	65,641	849	....	66,490	200,461	2,542
March	200,461	79,918	73,814	482	....	74,296	206,083	2,578
April	206,083	76,393	78,358	255	....	78,613	203,863	2,546
May	203,863	77,489	85,073	275	....	85,348	196,004	2,500
June	196,004	75,544	99,858*	204	2,100	102,162	169,386	2,518
July	169,386	73,101	59,460	94	900	60,454	182,033	2,358
August	182,033	69,768	58,918	864	....	59,782	192,019	2,251
September	192,019	62,202	57,971	3,214	....	61,185	193,036	2,073
October	193,036	63,938	63,910	1,813	....	65,723	191,251	2,063
November	191,251	62,346	74,596	2,844	....	77,440	176,157	2,078
December	176,157	69,666	84,498	6,906	....	91,404	154,419	2,247
1959 Total		858,020	872,867	17,971	3,000	893,838	....	....
1960								
January	154,419	73,326	79,325	3,949	....	83,274	144,471	2,365
February	144,471	74,738	78,029	4,118	....	82,147	137,062	2,577
March	137,062	86,028	80,760	5,764	....	86,524	136,566	2,775
April	136,566	83,221	64,251	7,675	....	71,926	147,861	2,774
May	147,861	79,216	54,790	7,399	....	62,039	165,038	2,555
June	165,038	76,723	50,690	3,385	....	54,075	187,686	2,557
July	187,686	73,754	50,002	4,379	....	54,381	207,059	2,379

* Inflated by abnormal shipments on consignment of approximately 9,000 tons.

U. S. Consumption of Slab Zinc

Bureau of Mines

By Industries (Short Tons)

	Galvanizers	Die Casters	Brass products	Rolled zinc	Zinc oxide & other	Total
1951 Total	386,373	266,442	141,456	64,000	28,738	887,009
1952 Total	375,563	236,022	155,311	51,508	30,885	849,289
1953 Total	403,162	305,846	177,801	53,784	38,037	977,636
1954 Total	398,599	286,817	107,293	45,979	33,342	876,130
1955 Total	439,694	404,790	144,816	50,363	39,302	1,081,468
1956 Total	421,218	352,451	122,395	45,382	36,251	983,097
1957 Total	355,796	358,543	111,114	39,544	20,486	924,063
1958						
April	27,464	17,829	6,392	3,259	1,295	58,432
May	30,935	18,316	6,597	2,896	2,263	61,907
June	34,377	21,497	6,643	2,961	2,212	67,690
July	30,677	17,387	6,275	2,848	1,920	60,007
August	34,663	20,382	8,358	3,379	1,901	70,033
September	34,048	25,188	9,624	3,458	770	74,122
October	36,513	27,682	11,753	3,845	881	81,919
November	31,658	27,311	10,067	3,276	826	74,302
December	31,746	29,926	10,529	3,681	1,018	78,082
Total	370,441	273,540	92,906	38,690	16,772	737,942
1959						
January	31,729	29,110	11,172	3,874	2,521	79,506
February	31,672	26,448	11,508	3,418	2,864	77,010
March	37,287	29,286	12,889	3,629	3,203	87,394
April	38,541	31,262	12,304	3,715	3,223	90,145
May	38,788	29,169	12,015	3,316	3,305	88,093
June	40,531	36,269	10,764	3,801	3,120	95,985
July	23,700	28,120	7,558	2,509	2,042	65,429
August	13,763	29.803	10.064	3.160	2.161	60.451
September	13,181	31,463	10,842	3,322	2,237	62,545
October	13,582	35,473	10,543	3,272	2,487	66,857
November	25,456	29,351	8,858	3,411	2,523	71,099
December	38,418	34,576	8,704	3,152	2,936	89,286
Total	346,648	370,330	127,221	40,759	22,622	933,800
1960						
January	38,389	31,813	9,838	3,130	3,352	88,122
February	35,001	34,829	9,259	3,250	3,156	87,365
March	36,206	31,889	10,108	3,309	3,403	86,515
April	31,319	24,483	7,097	3,032	3,033	71,164
May	31,503	22,957	7,697	3,402	3,386	70,505

Prime Western Zinc Prices

(East St. Louis, f.o.b.)

(Cents Per Pound)

(In tons of 2,240 pounds)

	1957	1958	1959	1960
Jan.	13.50	10.00	11.50	12.90
Feb.	13.50	10.00	11.411	13.00
Mar.	13.50	10.00	11.00	13.00
Apr.	13.50	10.00	11.00	13.00
May	11.933	10.00	11.00	13.00
June	10.84	10.00	11.00	13.00
July	10.00	10.00	11.00	13.00
Aug.	10.00	10.00	11.00	...
Sept.	10.00	10.00	11.381	...
Oct.	10.00	10.865	12.233	...
Nov.	10.00	11.386	12.50	...
Dec.	10.00	11.50	12.50	...
Aver.	11.40	10.313	11.46	...

High Grade Zinc Prices

(Delivered)

N. Y. Monthly Averages

(Cents Per Pound)

	1957	1958	1959	1960
Jan.	14.85	11.35	12.50	14.244
Feb.	14.85	11.35	12.411	14.25
Mar.	14.85	11.35	12.00	14.25
Apr.	14.85	11.084	12.00	14.50
May	13.283	11.00	12.00	14.50
June	12.19	11.00	12.00	14.50
July	11.35	11.00	12.00	14.35
Aug.	11.35	11.00	12.006	...
Sept.	11.35	11.00	12.625	...
Oct.	11.35	11.865	13.483	...
Nov.	11.35	12.386	13.75	...
Dec.	11.35	12.50	13.75	...
Aver.	12.75	11.407	12.544	...

U. K. Zinc Consumption

(British Bureau of Non-Ferrous Metal Statistics)

(In Tons of 2,240 Pounds)

	1958	1959	1960
Jan.	27,473	27,849	30,637
Feb.	24,551	25,676	30,480
Mar.	26,967	27,243	35,268
Apr.	24,984	28,006	28,069
May	24,579	26,167	30,848
June	25,587	30,221	33,058
July	23,794	26,318	...
Aug.	19,076	21,566	...
Sept.	26,747	31,270	...
Oct.	29,838	30,686	...
Nov.	26,432	29,221	...
Dec.	26,042	30,829	...
Total	306,070	335,890	...

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DAILY METAL REPORTER

Mine Production of Zinc in United States

(U. S. Bureau of Mines)

(In short tons)

	Eastern States	Central States	Western States	Total U.S.*
1954				
Total	166,487	63,100	234,942	464,539
1955				
Total	163,230	73,630	277,811	514,671
1956				
Total	175,310	61,080	301,253	537,643
1957				
Total	196,877	29,506	290,151	520,128
1958				
Total	180,373	10,050	221,582	412,005
1959				
Jan.	16,446	——	19,114	35,560
Feb.	16,881	——	19,292	36,104
Mar.	18,266	——	18,817	37,183
Apr.	19,198	——	19,132	38,330
May	19,150	——	19,201	38,351
June	18,217	——	18,447	36,664
July	13,158	——	18,656	31,814
Aug.	14,410	140	16,661	31,211
Sept.	14,226	154	15,026	29,406
Oct.	15,608	200	15,979	31,487
Nov.	18,285	200	15,698	34,183
Dec.	19,609	106	15,757	35,472
Total	204,384	800	211,781	416,965
1960				
Jan.	20,962	226	15,795	36,983
Feb.	21,001	195	16,823	38,019
Mar.	22,794	347	19,725	42,866
Apr.	22,410	606	17,839	40,855
May	23,103	408	16,595	40,106

*Includes Alaskan output in some months.

Mine Production of Lead in United States

(U. S. Bureau of Mines)

(In short tons)

	Eastern States	Central States	Western States	Total U.S.*
1953				
Ttl.	9,970	136,650	188,776	335,412
1954				
Ttl.	8,608	138,940	169,804	317,352
1955				
Ttl.	10,379	145,640	177,409	333,409
1956				
Ttl.	11,395	141,900	195,034	348,329
1957				
Ttl.	9,300	135,800	188,392	333,493
1958				
Ttl.	6,439	118,114	142,824	267,377
1959				
Feb.	611	8,457	12,314	21,382
Mar.	601	7,943	12,426	20,970
Apr.	454	8,103	12,684	21,241
May	412	7,253	12,509	20,174
June	458	8,185	12,764	21,407
July	369	8,190	11,010	19,569
Aug.	353	9,762	11,735	21,850
Sept.	510	9,698	10,328	20,536
Oct.	548	10,012	10,755	21,315
Nov.	620	9,350	10,954	20,924
Dec.	550	8,734	10,572	19,856
Ttl.	6,535	105,435	141,290	253,260
1960				
Jan.	535	9,035	11,235	20,805
Feb.	555	9,611	12,267	22,433
Mar.	619	11,146	13,695	25,460
Apr.	647	9,716	12,750	23,113
May	624	9,395	10,720	20,738

Mine Production of Gold in United States

(U. S. Bureau of Mines)

(In fine ounces)

	Eastern States	Western States	Alaska*	Total
1955				
Ttl.	2,026	1,634,625	247,535	1,884,186
1956				
Ttl.	1,998	1,607,930	204,300	1,814,228
1957				
Ttl.	2,174	1,556,450	210,000	1,768,624
1959				
Mar.	—	——	537	135,934
Apr.	—	——	2,956	141,777
May	—	——	9,719	157,338
June	—	——	23,792	163,057
July	—	——	33,324	171,749
Aug.	—	——	37,534	146,907
Sept.	—	——	30,886	114,364
Oct.	—	——	29,349	117,314
Nov.	—	——	2,903	91,175
Dec.	—	——	17,294	106,525
Ttl.	—	——	188,294	1,618,446
1960				
Jan.	—	——	2,460	——
Feb.	—	——	1,064	108,652
Mar.	—	——	231	120,928
Apr.	—	——	43	121,017
May	—	——	4,919	141,861
June	—	——	5,504	135,758

* Alaska totals based on mint and smelter receipts.

Mine Production of Recoverable Silver in United States

(U. S. Bureau of Mines)

(In Fine Ounces)

	Eastern States	Missouri	Western States	Alaska*	Total
1957 Total	610,386	240,000	37,018,950	26,000	37,895,336
1958 Total	†	210,000	†	28,000	33,022,225
1959					
March	†	17,200	†	67	2,982,254
April	†	17,600	†	421	2,963,775
May	†	15,900	†	1,201	3,046,085
June	†	17,900	†	2,953	2,926,886
July	†	8,900	†	4,149	2,905,320
August	†	10,600	†	5,523	2,291,540
September	†	10,400	†	3,224	1,794,029
October	†	10,900	†	3,793	1,952,629
November	†	10,400	†	469	1,874,624
December	†	10,140	†	2,334	1,825,198
Total	†	169,000	†	24,134	30,349,334
1960					
January	†	18,300	†	321	1,962,523
February	†	200	†	312	2,370,150
March	†	100	†	17	2,858,903
April	†	100	†	627	2,802,172
May	†	200	†	753	2,348,591

† Figures not available. * Alaska totals based on mint and smelter receipts.

U. S. Silver Production*

(A.B.M.S.)

(In thousands of ounces; commercial bars, 0.999 fine, and other refined forms)

	Dom.†	For.	Total
1954 Total	38,059	39,422	77,481
1955 Total	33,101	32,780	65,881
1956 Total	38,157	40,160	78,317
1957 Total	36,279	34,932	71,211
1958			
Total	35,691	37,572	73,263
1959			
February	2,827	2,913	5,740
March	2,823	4,087	6,910
April	2,946	3,233	6,179
May	2,641	3,484	6,125
June	3,219	3,231	6,450
July	2,609	3,284	5,893
August	1,472	1,229	2,701
September	390	577	967
October	510	610	1,120
November	635	602	1,237
December	756	4,311	5,067
Total	23,158	32,021	55,179
1960			
January	3,327	2,830	6,157
February	3,454	3,496	6,950
March	4,010	4,259	8,269
April	3,866	4,158	8,024
May	3,425	4,018	7,443
June	3,278	3,924	7,202

* The separation between silver of foreign and domestic origin on the basis of refined bars and other refined forms is only approximate.

† Includes purchases of crude silver by the U. S. Mint.

Production of Primary Aluminum in the U. S.

(U. S. Bureau of Mines)

(In short tons)

	1953	1954	1955	1956	1957	1958	1959	1960
Jan.	89,895	116,247	128,203	140,394	147,029	139,910	156,708	164,024
Feb.	92,649	110,483	116,236	132,763	119,059	121,980	142,116	156,826
Mar.	104,460	122,339	130,272	145,895	135,706	134,019	157,189	170,688
Apr.	102,071	120,434	126,394	144,726	139,152	128,559	155,213	168,596
May	105,464	125,138	131,128	150,800	145,174	129,083	163,857	175,863
June	104,152	120,758	127,634	145,726	138,007	115,325	167,323	171,356
July	109,285	126,161	132,669	151,624	142,157	118,811	179,594	177,564
Aug.	110,545	125,296	133,551	92,406	143,449	125,416	172,817	....
Sept.	109,333	120,332	130,606	132,316	129,278	124,713	168,205	....
Oct.	108,219	125,089	134,655	149,125	133,759	139,847	173,762	....
Nov.	105,636	121,252	133,689	145,081	135,024	140,962	153,666	....
Dec.	110,291	127,056	140,748	148,391	140,033	153,301	162,996	....
Ttl.	1,252,013	1,460,565	1,565,721	1,679,427	1,647,710	1,655,556	1,953,019	....

Average Silver Prices

(Cents per fine ounce)

	1957	1958	1959	1960
Jan.	91.375	89.449	90.19	91.375
Feb.	91.375	88.625	90.444	91.375
Mar.	91.375	88.625	91.351	91.375
Apr.	91.375	88.625	91.375	91.375
May	91.307	88.625	91.375	91.375
June	90.456	88.625	91.375	91.375
July	90.31	88.625	91.375	91.375
Aug.	90.909	88.625	91.399	..
Sept.	90.602	88.673	91.399	...
Oct.	90.625	89.966	91.375	...
Nov.	90.382	90.125	91.375	...
Dec.	89.80	89.932	91.375	...
Aver.	90.824	89.043	91.226	...

Note — The averages are based on the price of refined bullion imported on or after August 31, 1943.

U. S. Lead Imports

(A.B.M.S.) (Bureau of the Census)

(In tons of 2,000 lbs.)

	1960		
	Apr.	May	June
Ore, matte, etc. (cont.)	8,490	14,137	12,947
Canada	1,650	1,862	962
Mexico	34	139	106
Guatemala	...	1,170	535
Honduras	639	402	...
Argentina	103	...	...
Bolivia	542	1,258	385
Columbia	187	...	155
Peru	1,823	2,594	3,381
Union of S. Africa	3	6,104	5,575
Australia	3,483	576	...
Philippines	7	...	36
Other countries	19	32	1,812
Base bullion (content)	...	...	250
Other countries	...	...	250
Pigs and bars	19,706	12,326	16,929
Canada	1,541	1,005	3,644
Mexico	3,126	4,071	6,694
Peru	899	1,869	4,000
Belgium	...	...	287
France	...	...	2
Germany (West)	315	...	...
Spain	300	...	...
Sweden	...	...	1,110
United Kingdom	6	...	...
Yugoslavia	3,037	5,180	...
Rhodesia & Nyasaland	224	...	...
Australia	10,258	201	1,192
Total Imports:			
Ore, base bullion, ref.	28,196	26,463	30,126
Lead scrap, dross, etc. (content)	1,230	1,167	845
Antimonial lead & typemetal	205	260	179
Lead content thereof	157	211	154

U. S. Copper Scrap Exports

(A.B.M.S.) (Bureau of the Census)

(In tons of 2,000 lbs.)

	1960		
	Apr.	May	June
Copper scrap, unalloyed* (new and old)	5,333	5,670	6,156
Canada	125	56	146
Argentina	...	22	22
Belgium	89	267	131
France	...	...	27
Germany (West)	1,965	3,295	2,620
Italy	301	398	622
Netherlands	264	168	343
Spain	1,721	306	271
Sweden	168	275	...
United Kingdom	27	191	778
India	151	120	152
Japan	511	413	925
Hong Kong	...	66	25
Other countries	11	93	94
Copper-base scrap, alloyed† (new and old)	9,511	7,730	12,831
Canada	4	...	6
Mexico	1	4	2
Belgium	27	93	53
France	16	23	...
Germany (West)	923	1,502	2,110
Italy	932	627	1,071
Netherlands	350	394	186
Spain	...	...	22
Switzerland	86	13	...
United Kingdom	113	16	2,097
India	28	80	111
Japan	6,987	4,961	7,166
Hong Kong	22	17	...
Other countries	22	...	7

* Ash, brass mill, clippings, dross, flue dust, residues, scale, skimmings, wire scrap.

† Copper-base alloys, including brass and bronze—Ashes, clippings for remanufacture, cupro-nickel scrap, cupro-nickel trimmings, nickel silver scrap, phosphor bronze, phosphor copper, skimmings, turnings, round.

U. S. Copper Imports

(A.B.M.S.) (Bureau of the Census)

(In tons of 2,000 lbs.)

	1960		
	Apr.	May	June
Ore, matte & regulus (content)	10,768	6,314	8,080
Canada	655	645	1,116
Mexico	108	134	222
Cuba	1,291	1,475	1,209
Bolivia	155	...	...
Chile	1,891	2,042	186
Peru	1,193	1,014	922
Philippines	2,368	...	2,196
Union of South Africa	3,080	950	2,229
Australia	27	54	...
Blister copper (cont.)	22,815	16,180	36,670
Chile	14,941	10,169	20,033
Mexico	1,352	283	1,825
Peru	6,522	3,400	14,812
Union of South Africa	...	2,328	...
Refined cathodes and shapes	10,087	7,152	7,464
Canada	9,282	6,839	7,353
Mexico	110	110	110
Peru	250	201	...
Belgium	225	...	...
Germany (West)	...	2	...
Spain	...	...	1
Sweden	220	...	...
Total Imports:			
Crude and Refined	43,670	29,646	52,214
Old and scrap (cont.)	252	61	133
Composition metal (content)	...	28	1
Brass scrap and old (cu. cont.)	90	66	257

U. S. Copper Exports

(A.B.M.S.) (Bureau of the Census)

(In tons of 2,000 lbs.)

	1960		
	Apr.	May	June
Ore, concentrates, matte and other unrefined (content)	671	278	1,308
Refined ingots, bars, etc.†	31,329	50,753	38,757
Canada	132	31	38
Mexico	...	...	44
Cuba	...	4	...
Argentina	457	512	1,519
Brazil	493	681	2,656
Austria	...	166	56
Belgium	88	688	756
Denmark	112	112	168
France	5,480	7,484	971
Germany (West)	6,423	14,548	8,719
Italy	5,419	7,177	7,510
Netherlands	794	2,068	896
Norway	7	290	...
Portugal	...	56	111
Sweden	...	728	307
Switzerland	190	307	419
U. Kingdom	6,378	11,463	9,615
Yugoslavia	168	560	...
Taiwan	116	281	33
India	112	233	1,040
Japan	4,531	3,010	3,588
Australia	336	224	224
Other countries	93	130	87
Total Exports:			
Crude and refined	32,000	51,031	40,065
Pipes and tubes	47	64	39
Plates and sheets	46	32	12
Semifabricated forms	233	630	729
Wire, bare	202	147	170
Building wire and cable‡	161	129	132
Weatherproof wire‡	4	7	9
Insulated copper wire n.e.s.‡	810	771	951

† Includes exports of refined copper resulting from scrap that was reprocessed on toll for account of the shipper.

‡ Gross weight; n.e.s.—not elsewhere specified.

Comparative Metal Prices

	Av. 1939	OPA Av. 1946	1960 Aug.22
Copper, domestic Electro., Del. Val.	11.20	14.375	33.00
Lead (N. Y.)	5.05	8.25	12.00
P. W. Zinc (E. St. Louis, f.o.b.)	5.05	5.05	13.00
New York, del.	...	...	13.50
Tin Spot Straits, N. Y.	...	...	101.625
Aluminum ingot 99½%+	20.00	15.00	26.00
Antimony (R.M.M. brand f.o.b. Laredo)	12.36	14.50	29.00

U. S. Zinc Imports

(A.B.M.S.) (Bureau of the Census)

(In tons of 2,000 lbs.)

	1960		
	Apr.	May	June
Zinc ore (content)	39,168	49,160	32,696
Canada	14,397	9,474	9,746
Mexico	15,058	22,863	12,893
Guatemala	...	...	1,452
Honduras	138	91	320
Bolivia	64	52	22
Colombia	15	5	5
Peru	2,225	10,721	5,096
Spain	3,808	...	2,383
Union of South Africa	2,892	803	769
Australia	537	5,071	...
Philippines	25	27	2
Other countries	9	53	8
Zinc blocks, pigs, etc.	7,500	6,820	15,475
Canada	4,092	3,709	10,763
Mexico	661	1,102	1,392
Peru	450	492	1,088
Belgium	663	55	1,102
Germany (West)	443	112	...
Italy	1,007	...	165
United Kingdom	...	110	55
Yugoslavia	...	468	221
Belgian Congo	184	772	689
Total Imports:			
Zinc ore blocks, pigs	46,668	55,980	48,171
Dross and skimmings	155	46	122
Old and worn out	38	16	...

U. S. Zinc Export

(A.B.M.S.) (Bureau of the Census)

(In tons of 2,000 lbs.)

	1960		
	Apr.	May	June
Slabs, blocks, etc.	4,656	7,066	4,236
Canada	207	...	...
Mexico	1	...	...
Brazil	22	...	123
Chile	...	3	...
Colombia	...	220	220
Belgium	...	336	...
Denmark	...	140	...
Germany	...	1,344	112
Italy	...	224	...
Netherlands	224	224	224
Sweden	224	224	224
Switzerland	56	224	...
United Kingdom	3,165	3,738	1,229
Japan	553	...	...
Taiwan	...	330	...
India	196	...	1,822
Other countries	8	59	...
Philippines	...	...	282
Total Exports:			
Ore, conc., slabs	4,656	7,066	4,236
Scrap, ashes, dross and skimmings	437	1,406	974
Battery shells and parts, unassembled	...	36	1
Rolled in sheets, plates and strips and die castings	342	336	233
Zinc and zinc alloys in crude and semifabricated forms	428	81	191
Zinc oxide	133	196	234

U. S. Lead Exports

(A.B.M.S.) (Bureau of the Census)

(In tons of 2,000 lbs.)

	1960		
	Apr.	May	June
Lead, ore, concentrates matte and base bullion (content)	5	15	74
Mexico	5	15	...
Iran	...	...	74
Pigs and bars	84	750	382
Canada	3	7	9
Mexico	3	...	4
Cuba	3	...	...
Guatemala	...	...	2
Colombia	...	...	2
Peru	...	...	1
Belgium	...	...	5
Philippines	5	...	...
Taiwan	...	734	352
Korea	67	...	...
Other countries	3	9	7
Total Exports:			
Ore, base bullion, ref.	89	765	456
Scrap	151	60	129
Lead plate, including battery plate, not assembled as complete battery units	8	...	3
Babbitt metal	8	3	8
Lead and lead base alloys in semifabricated forms	63	39	32

World Production of Copper

(American Bureau of Metal Statistics)

(In Tons of 2,000 Pounds)

	United States (a)	Canada (b)	Mexico (crude) (c)	Chile (d)	Peru (d)	Fed. Rep. of Germany (e)	Norway (f)	United Kingdom (g-h)	Yugoslavia (e)	India (f-h)	Japan (e)	Turkey (f)	Australia (e)	Northern Rhodesia (e)	Union of South Africa (d)
1955															
Total	1,036,702	326,599	61,583	447,288	35,478	286,805	14,876	138,271	31,151	8,432	124,908	26,313	41,935	350,302	47,176
1956															
Total	1,133,134	356,251	69,918	506,251	35,005	279,461	16,457	127,365	32,390	8,827	139,062	27,101	55,711	435,186	47,914
1957															
Total	1,115,483	360,745	42,905	....	46,141	255,710	17,265	121,799	37,186	9,298	143,654	27,101	55,633	499,418	47,828
1958															
Total	1,881,170	346,816	68,386	462,064	42,750	295,312	19,529	106,134	37,116	9,062	136,612	24,676	72,361	426,513	53,090
1959															
Feb.	88,432	28,016	4,810	43,589	1,627	24,289	1,599	9,211	3,521	557	11,388	1,614	5,930	44,420	4,339
Mar.	101,410	32,427	4,771	44,554	1,601	26,959	1,694	8 654	3,536	810	10,746	2,034	4,573	51,630	4,611
April	98,376	32,130	5,201	42,715	4,250	26,859	1,870	11,259	3,593	763	17,938	2,330	7,419	48,150	4,528
May	104,236	32,622	5,275	46,083	3,770	25 358	1,771,	7,693	3,503	764	18,516	2,480	6,408	53,067	4,676
June	99,419	36,979	5,847	46,901	3,357	24,635	1,743	10,909	3,231	776	18,621	2,362	8,133	53,895	4,766
July	81,662	36,067	5,755	45,508	3,676	25,890	1,639	7,108	3,369	781	18,957	1,846	5,346	48,806	4,541
Aug.	51,327	35,045	5,326	50,093	2,533	24,716	1,677	6,610	1,810	774	18,805	2,378	5,798	50,285	4,357
Sept.	19,503	35,740	4,125	44,439	8,782	25,357	1,986	10,438	3,619	799	18,837	2,427	7,111	48,753	3,742
Oct.	20,931	35,980	4,068	36,449	3,061	27,840	1,800	8,951	3,137	804	18,898	2,304	....	49,519	3,025
Nov.	18,351	35,271	4,886	50,877	2,904	25,258	1,495	10,076	3,451	802	17,186	2,923	....	49,232	5,005
Dec.	26,686	34,416	4,872	53,186	3,438	28,143	2,035	8,736	2,403	421	20,498	....	....	48,350	5,244
1960															
Jan.	64,098	36,404	4,326	47,550	2,901	27,222	1,941	7,489	3,310	769	21,096	....	4,702	56,495	5,061
Feb.	85,899	35,824	4,817	43,380	3,579	25,288	1,954	8,719	3,013	831	....	....	6,915	47,322	3,017
Mar.	107,895	38,341	5,376	49,124	15,956	30,836	2,008	8,453	3,617	913	22,968	2,723	6,310	52,332	4,292
Apr.	104,895	34,289	4,672	....	16,501	26,915	1,905	9,640	3,177	808	21,563	....	....	54,595	4,738
May	104,272	....	4,300	....	16,198	29,897	....	12,379	....	838	....	....	....	55,596	.....
June	98,344	....	....	....	....	....	....	....	....	....	....	....	....	....	.....

(a) Reported by Copper Institute. Crude, "recoverable contents of mine production or smelter production or shipments, and custom intake." Does not include intake of scrap nor of imported ore except that received from Cuba and Philippines. (b) Blister copper plus recoverable copper in concentrates, matte, etc., exported. (c) Crude copper, i. e., copper content of blister or converter copper as originally produced in the several countries, although some of it may be refined at home; e. g., in Rhodesia. (d) Blister and/or refined. (e) Refined. There are quantities of scrap included in the electrolytic production in addition to that reported, tonnage of which is not obtainable. (f) Smelter production. (g) Refinery production from imported blister only. (h) British Bureau of Non-Ferrous Metal Statistics. * Refined.

World Production of Refined Lead

(American Bureau of Metal Statistics)

(In Tons of 2,000 Pounds)

	United States	Canada	Mexico	Peru	Belgium	France	Fed. Rep. of Germany	Italy	Spain	Yugoslavia	Japan	Australia (a)	French Morocco	Tunisia	Rhodesia	Total
1955																
Total	547,153	148,811	221,138	67,303	91,241	73.251	162,508	46,806	67,509	83,347	40,912	254,558	28,870	28,620	17,976	1,893,125
1956																
Total	613,293	147,865	213,524	61,917	111,479	73,251	178,713	42,780	64,824	83,507	51,019	256,300	30,993	26,623	17,024	1,984,344
1957																
Total	604,533	142,935	218,266	55,971	....	94,509	195,136	42,336	61,332	85,313	59,670	261,035	34,442	27,069	12,364	2,041,530
1958																
Total	575,612	130,886	246,443	80,999	119,192	111,337	223,973	60,860	77,490	92,903	52,915	271,654	42,266	32,359	16,492	1,955,753
1959																
Feb.	39,498	12,740	15,472	2,662	9,460	5,812	17,869	4,437	6,020	8,596	6,474	22,037	2,319	1,765	1,344	157,928
Mar.	39,238	13,704	16,305	3,424	8,447	6,733	17,553	3,168	6,196	8,153	6,889	20,144	1,905	2,429	1,344	156,914
April	40 606	13,555	16,621	4,438	8,038	5,541	17,141	4,942	6,491	6,876	6,615	23,919	2,726	2,155	1,344	162,611
May	39,101	13,357	16,934	6,606	8,797	7,363	17,728	3,614	7,435	8,369	6,137	23,499	2,050	1,784	1,344	165,602
June	37,459	12,997	20,000	6,540	9,125	6,976	18,128	2,453	6,510	7,854	6,349	25,151	1,552	926	1,344	164,815
July	32,882	8,096	17,099	6,401	8,734	6,065	16,381	4,384	6,074	2,221	5,303	19,125	2,859	1,749	1,344	139,291
Aug.	25,589	7,357	19,086	4,267	7,547	6,581	15,256	3,354	6,049	8,645	5,344	21,168	862	2,863	1,344	136,725
Sept.	14,801	9,775	14,320	4,354	7,217	6,164	17,773	4,502	4,728	8,731	5,322	22,786	3,567	2,352	1,344	128,850
Oct.	18,892	9,897	17,988	6,093	7,107	6,004	18,070	4,310	6,193	....	4,663	24,226	3,466	2,669	1,344	.....
Nov.	18.796	9,674	18,223	6,199	7,766	6,431	17,820	4,310	6,193	8,273	4,594	24,226	3,466	2,669	1,344	141,370
Dec.	30,160	10,071	16,448	5.826	7,708	6,581	19,726	4,638	6,639	11,393	6,865	23,448	3,869	2,056	1,344	.....
1960																
Jan.	40,043	11,664	15,821	6,127	8,450	6,818	19,424	3,128	7,284	6,896	6,699	26,233	2,448	....	1,309	163,457
Feb.	36,435	12,459	17,371	6,063	8,746	6,276	17,907	4,260	6,468	7,167	....	24,964	2,267	1,047	1,316	.....
Mar.	37,192	13,967	13,687	7,154	9,561	8,500	19,743	3,716	6,249	7,804	7,034	19,307	2,916	1,774	1,348	161,625
Apr.	40,177	....	17,715	6,945	9,357	9,716	19,202	3,607	6,885	6,382	6,647	19,663	3,053	2,663	1,347	.....
May	36,509	....	18,736	6,905	9,406	9,370	20,299	4,074	....	....	....	....	3,103	1,241	1,354	.....
June	....	....	....	6,695	....	....	....	....	....	....	....	....	....	....	1,355	.....

(a) Production credited to Australia includes lead refined in England from Australian base bullion.

World Production of Slab Zinc

(American Bureau of Metal Statistics)

(In Tons of 2,000 Pounds)

	United States (a)	Can. (b)	Mexico	Peru (b-c)	Belgium	France (a)	Fed. Rep. of Germany	Great Britain	Italy	Netherlands	Norway (b)	Spain	Yugoslavia	Japan (a)	Australia (b)	Rhodesia (b)	Total (d)
1955																	
Total	1,031,018	257,008	61,879	18,943	233,623	123,623	197,024	90,917	77,761	31,202	49,724	26,244	15,175	122,965	113,221	31,248	2,534,457
1956																	
Total	1,062,954	255,601	62,136	10,428	251,906	124,105	204,961	90,784	80,407	32,123	53,170	25,224	15,434	153,821	117,445	32,396	2,630,383
1957																	
Total	1,574,500	247,356	62,354	35,772	259,701	148,455	202,627	85,348	81,179	32,786	52,787	24,279	30,256	152,145	123,587	33,040	2,691,699
1958																	
Total	892,607	254,661	18,354	34,685	257,540	177,422	210,408	80,494	5,955	2,841	54,423	26,750	34,446	166,883	128,548	39,508	2,464,639
1959																	
Jan.	76,481	21,456	5,476	2,753	19,857	13,903	17,164	5,955	5,617	2,693	4,826	2,028	2,647	11,679	10,541	2,800	211,506
Feb.	71,174	19,709	4,915	1,497	19,838	13,491	15,632	6,123	4,735	2,927	4,928	1,926	2,510	14,105	9,617	2,548	199,495
Mar.	79,918	22,135	5,439	2,363	20,215	14,230	17,325	7,797	6 801	2 921	4,917	2,369	3,014	13,217	10,759	2,800	221,316
Apr.	76,393	21,512	5,225	2,502	20,408	14,087	16,426	6,030	7,039	2,816	3,621	2,239	2,509	15,645	10,472	2,716	216,378
May	77,489	21.147	5,108	2,545	21,181	13,902	16,633	6,595	7,790	2,823	4,798	2,273	2,701	16,171	11,137	2,744	226,057
June	75,544	21 250	4,776	2,524	21,004	14,120	16,185	8,271	7,164	2,899	4,759	2,180	2,083	15,873	10,899	2,716	218,131
July	73,101	21,055	5,038	2,634	20,100	14,262	16,325	6,112	7,303	2,917	4,539	2,057	3,796	15,233	11,189	2,856	215,525
Aug.	69,768	21.588	4,965	2.504	19,472	14,138	16,585	6,507	7,370	2,968	4,646	2,198	3,355	15,308	11,298	2,912	211,964
Sept.	62,202	20,744	4,935	2,537	19,387	11,883	16,366	7,892	6,819	2,928	4,708	2,208	3,013	15,133	10,985	2,800	199,560
Oct.	63,938	21,744	5,084	2,545	20,512	13,228	17,064	5,657	6,403	2,967	3,570	2,245	....	....	10,904	2,800	.....
Nov.	62,346	21,039	5,072	2,608	21,180	12,251	16,689	6,208	6,403	2,967	3,570	2,245	4,990	13,634	10,904	2,800	199,319
Dec.	69,666	21,963	5,330	2,578	21,810	12,807	17,336	7,772	6,519	3,201	3,074	2,331	....	15,141	11,305	2,906	.....
1960																	
Jan.	73,326	22,426	5,278	2,608	21,957	12,675	17,409	7,250	6,781	2,786	4,743	2,402	3,178	15,498	11,023	2,707	220,587
Feb.	74,738	21,055	4,627	2,660	22,059	13,331	16,501	5,761	6,774	2,957	4,299	2,213	3,180	....	10,357	2,664	.....
Mar.	86,028	22,549	5,297	2,841	22,406	14,424	17,663	7,868	7,794	3,462	4,388	2,242	3,392	16,307	11,137	2,894	.....
Apr.	83,221	21,391	4,662	2,760	22,608	14,235	16,883	6,860	7,173	3,112	4,421	2,146	3,100	16,188	10,874	2,800	.....
May	79,216	21,701	4,972	3,051	23,278	14,071	17,147	5,137	8,038	3,361	3,638	....	....	....	11,238	2,897	.....
June	76,723	....	....	2,951	....	....	6,786	....	....	....	3,988	....	....	....	....	2,803	.....

(a) Partially electrolytic. (b) Entirely electrolytic. (c) Beginning 1954 both electrolytic and electrochemic. (d) The above totals omit production in Russia, Czechoslovakia, Poland and in Argentina.

U. K. Stocks of Zinc

(British Bureau of Non-Ferrous Metal Statistics)

(In tons of 2,240 lbs.)

At start of:	Virgin Zinc 1959	Virgin Zinc 1960	Zinc Conc. 1959	Zinc Conc. 1960
Jan.	34,166	37,162	56,371	45,885
Feb.	34,805	48,337	58,518	41,547
Mar.	36,850	48,689	57,897	39,546
Apr.	38,457	51,064	52,151	44,250
May	38,643	54,491	47,936	47,486
June	37,713	52,470	41,954	47,595
July	38,297	52,004	45,640	54,044
Aug.	37,427	....	43,948	....
Sept.	40,358	....	42,385	....
Oct.	40,995	....	39,233	....
Nov.	35,994	....	38,948	....
Dec.	35,460	....	47,131	....

U. K. Zinc Imports

(British Bureau of Non-Ferrous Metal Statistics)

(In tons of 2,240 lbs.)

(Gross Weight)	1960 Mar.	1960 Apr.	1960 May
Zinc ore and concentrates	26,848	20,356	15,128
Zinc conc.*	12,879	10,451	†
Australia	10,666	8,640	...
Peru	593	...	...
Burma	970	873	...
Other countries	650	938	...
Zinc and zinc alloys	19,802	15,094	13,018
Rhodesia-Nyasaland	375	...	...
Australia	...	700	...
Canada	11,462	6,642	4,442
Belgium	975	1,510	775
Germany (W.)	70	11	12
Netherlands	25	94	195
Soviet Union	3,071	1,804	1,034
United States	639	949	4,187
Belgian Congo	1,550	1,325	75
Poland	750	175	500
Other countries	885	1,884	1,798

* British Bureau of Non-Ferrous Metal Statistics. The estimated zinc content is not the content of the gross weight as officially reported for any comparable period.
† Not available.

U. K. Copper Exports

Statistics)

(In tons of 2,240 lbs.)

	1960 Mar.	1960 Apr.	1960 May
Copper unwrought — ingots blocks, slabs, bars, etc.	3,726	3,422	2,953
Plates, sheets, rods, etc.	4,931	1,731	6,990
Wire (including uninsulated electric wire)	316	264	213
Tubes	1,139	958	1,187
Other copper worked including pipe fittings)	95	166	37
Total	10,207	6,541	11,380

Copper Consumption in United Kingdom

British Bureau of Non-Ferrous Metal Statistics

(In tons of 2,240 pounds)

	Unalloyed	Alloyed*	Total	Virgin	Scrap
1956 Total	388,167	251,312	639,479	500,794	138,685
1957 Total	407,326	234,158	641,484	507,493	133,991
1958 Total	442,977	225,007	667,978	534,619	133,359
1959					
March	27,864	19,567	47,431	36,124	11,307
April	32,742	22,782	55,525	43,015	12,509
May	28,421	19,199	47,620	33,367	14,253
June	35,009	21,103	56,112	44,761	11,351
July	24,714	19,858	44,572	32,034	12,538
August	24,524	16,097	40,621	30,866	9,735
September	35,447	21,920	57,367	45,178	12,189
October	37,221	23,880	61,101	47,345	13,756
November	37,463	23,392	60,855	47,031	13,824
December	36,044	23,202	59,246	44,753	14,493
Total	382,295	250,871	633,166	478,819	154,347
1960					
January	33,888	23,428	57,316	41,741	15,575
February	37,662	23,925	61,587	48,824	12,763
March	41,306	26,676	67,982	54,389	13,593
April	35,153	23,525	58,678	41,147	17,531
May	38,621	25,038	63,659	46,406	17,253
June	40,612	24,786	65,398	54,830	10,568

* Includes copper sulphate effective October, 1954.

U. K. Virgin Copper Stocks

(In long tons)

(British Bureau of Non-Ferrous Metal Statistics)

At start of.	1958	1959	1960
Jan.	91,477	64,184	55,005
Feb.	82,483	65,941	61,008
Mar.	89,147	65,875	55,979
Apr.	94,330	72,946	51,137
May	88,582	72,318	59,404
June	88,913	78,505	77,808
July	81,851	80,477	71,391
Aug.	84,756	81,986	....
Sept.	89,899	89,483	....
Oct.	85,092	77,803	....
Nov.	74,696	64,602	....
Dec.	69,023	60,936	....

U. K. Refined Lead Stocks

(British Bureau of Non-Ferrous Metal Statistics)

(In long tons)

At start of.	1958	1959	1960
Jan.	51,296	45,444	48,035
Feb.	49,134	48,102	44,290
Mar.	47,738	40,535	42,043
Apr.	40,547	53,289	41,248
May	37,509	62,286	50,363
June	34,608	63,135	45,657
July	40,518	57,810	46,542
Aug.	37,148	67,586	....
Sept.	43,758	66,048	....
Oct.	48,856	63,121	....
Nov.	40,216	56,697	....
Dec.	35,335	46,984	....

Zinc Imports and Exports By Principal Countries

(A.B.M.S.)

Reported in pigs, bars, etc.; metric tons except where otherwise noted.

	1960 Feb.	1960 Mar.	1960 Apr.
IMPORTS			
U. S. (s.t.)	9,477	12,122	7,500
Canada (s.t.)	1	1	...
Denmark	1,124	934	929
France	1,373	2,116	2,744
Germany, W.*	7,743	12,086	...
Italy	353	49	...
Netherlands	1,239	731	618
Sweden	2,621	1,529	3,148
Switzerland*	1,834	1,982	1,608
U. K. (l.t.)	17,616	19,802	15,094
India† (l.t.)	3,433	7,136	5,131
EXPORTS			
U. S. (s.t.)	1,816	5,878	4,656
Canada (s.t.)	18,106	16,887	10,281
Belgium	11,049	...	...
Denmark	264	25	109
France	564	521	548
Germany, W.*	2,673	2,294	...
Italy	1,307	...	...
Netherlands	1,395	1,693	993
Norway	2,843	2,217	...
Switzerland*	18	...	...
U. K.‡ (l.t.)	763	720	1,265
Northern Rhodesia† (l.t.)	2,540	2,379	2,240
Australia (l.t.)	2,833	2,036	2,068
Belgian Congo	4,208	...	...

* Includes scrap.
‡ Includes manufactures.
† British Bureau of Non-Ferrous Metal Statistics.

United Kingdom Tin Statistics

(British Bureau of Non-Ferrous Metal Statistics)

	Tin Content of Tin in Ore: Imports	Production*	Stock at end of period*	Tin Metal: Imports	Production*	Consumption	Exports & Re-exports	Stock at end of period
1957 Total	39,272	1,028	....	9,834	34,175	20,365	7,362	71,931
1958 Total	27,419	1,090	....	13,195	32,551	20,413	20,398	19,054
1959								
June	1,323	129	920	25	2,267	1,987	2,919	9,638
July	2,971	112	2,043	47	2,735	1,682	2,689	11,255
August	1,970	58	1,704	21	1,908	1,224	2,956	10,752
September	2,990	115	2,132	33	2,229	2,093	3,742	10,624
October	2,259	108	1,851	24	3,101	1,915	1,986	10,383
November	3,936	90	3,317	25	2,513	1,861	1,997	10,545
December	2,161	117	2,941	15	2,858	1,997	1,513	11,523
Total	25,812	1,252	....	726	27,229	21,396	21,358	10,884
1960								
January	1,490	117	1,845	190	2,377	1,878	1,394	10,884
February	2,417	105	2,095	421	2,144	1,879	1,189	10,240
March	2,294	98	2,316	10	2,743	2,191	1,099	10,677
April	1,532	90	2,216	159	1,645	1,774	231	10,349
May	1,785	....	....	661	2,429	1,902	723	10,565

*As reported by International Tin Study Group. Production of Tin Metal includes production from imported scrap and residues refined on toll. Stocks exclude strategic stock but include official warehouse stocks.

Canada's Copper Output

(Dominion Bureau of Statistics)

(Primary Copper)

(In Tons)

	1957	1958	1959	1960
Jan.	25,469	32,868	24,664	36,404
Feb.	21,861	28,668	28,016	35,824
Mar.	27,663	29,239	32,427	38,341
Apr.	27,398	30,635	32,130	34,290
May	29,086	32,471	32,622	36,892
June	24,093	32,418	36,979	...
July	27,195	31,131	36,067	...
Aug.	26,943	30,867	35,045	...
Sept.	24,633	27,546	35,740	...
Oct.	30,312	22,572	35,980	...
Nov.	27,331	20,368	35,271	...
Dec.	31,604	19,033	34,416	...
Year	323,588	346,816	399,362	

Canada's Copper Exports

(Dominion Bureau of Statistics)

(Ingots, bars, slabs and billets)

(In Tons)

	1957	1958	1959	1960
Jan.	20,582	26,883	10,620	29,046
Feb.	16,272	16,816	10,304	22,295
Mar.	14,270	18,662	11,025	20,338
Apr.	16,417	23,261	17,079	21,135
May	19,048	19,358	21,739	20,767
June	10,826	20,831	21,310	....
July	18,621	21,703	13,650	....
Aug.	21,980	15,881	15,155	....
Sept.	14,314	15,373	21,077	....
Oct.	13,110	20,341	19,977	....
Nov.	16,622	14,391	23,172	....
Dec.	16,282	11,138	20,542	....
Year	198,794	224,638	198,010	....

Canada's Lead Output

(Dominion Bureau of Statistics)

(Recoverable Lead)*

(In Tons)

	1957	1958	1959	1960
Jan.	14,032	17,117	17,118	16,284
Feb.	15,170	14,908	15,923	16,397
Mar.	16,940	15,421	17,389	16,887
Apr.	14,275	15,644	16,237	16,266
May	14,591	15,131	16,813	16,558
June	16,431	15,645	14,968	....
July	14,377	14,076	15,111	....
Aug.	14,679	12,260	14,104	....
Sept.	15,869	15,401	12,420	....
Oct.	14,151	14,564	13,958	....
Nov.	15,879	16,680	13,024	....
Dec.	15,296	18,248	14,545	....
Year	171,690	185,095	181,610	....

* New base bullion from Canadian ores plus recoverable lead in ores or concentrates shipped for export.

Canada's Lead Exports

(Dominion Bureau of Statistics)

(In Pigs)

(In Tons)

	1957	1958	1959	1960
Jan.	8,946	4,752	5,034	5,549
Feb.	6,633	1,553	6,377	6,692
Mar.	7,044	9,497	11,831	11,216
Apr.	7,314	7,450	7,836	5,407
May	9,676	7,764	12,230	6,979
June	7,210	4,036	15,610	....
July	4,682	12,629	3,478	....
Aug.	6,416	7,232	4,023	....
Sept.	8,467	5,125	3,895	....
Oct.	7,761	10,320	4,885	....
Nov.	6,175	10,641	6,785	....
Dec.	4,217	11,352	10,218	....
Year	84,541	92,351	92,252	....

Canada's Zinc Output

(Dominion Bureau of Statistics)

(Refined Zinc)

(In Tons)

	1957	1958	1959	1960
Jan.	20,340	21,801	21,456	22,247
Feb.	19,808	19,743	19,709	21,055
Mar.	21,941	22,314	22,135	22,549
Apr.	20,504	20,986	21,512	21,391
May	20,564	21,269	21,147	21,701
June	19,928	20,353	21,250	....
July	20,061	20,873	21,055	....
Aug.	20,305	21,152	21,588	....
Sept.	20,247	20,530	20,744	....
Oct.	20,892	21,125	21,744	....
Nov.	20,933	20,273	21,039	....
Dec.	21,823	21,705	21,963	....
Year	247,351	252,157	255,342	....

Canada's Zinc Exports

(Dominion Bureau of Statistics)

(Ore in Tons)

	1957	1958	1959	1960
Jan.	19,304	17,349	13,565	18,445
Feb.	16,618	8,376	12,675	12,995
Mar.	14,923	19,636	14,617	14,108
Apr.	17,131	16,346	12,789	13,400
May	16,680	15,121	11,049	....
June	16,157	7,776	20,298	....
July	12,912	27,394	23,122	....
Aug.	20,520	15,906	18,464	....
Sept.	17,671	8,670	14,367	....
Oct.	16,735	22,810	12,518	....
Nov.	17,225	17,978	16,577	....
Dec.	16,131	18,344	11,043	....
Year	202,007	195,707	181,084	....

Canada's Silver Exports

(Dominion Bureau of Statistics)

(In ores and concentrates)

Fine Ounces)

	1958	1959	1960
Jan.	634,715	185,367	887,242
Feb.	208,149	329,742	1,312,006
Mar.	350,827	425,973	740,465
Apr.	284,971	989,593	809,500
May	376,082	564,017	491,805
June	438,253	871,570	.....
July	529,770	728,598	.....
Aug.	279,511	688,042	.....
Sept.	583,570	763,017	.....
Oct.	323,475	767,939	.....
Nov.	217,892	70,205	.....
Dec.	871,573	430,802	.....
Year	5,098,788	6,210,175	.....

Canada's Silver Output

(Dominion Bureau of Statistics)

(In Ounces)

	1958	1959	1960
Jan.	2,529,583	3,094,440	2,755,069
Feb.	2,294,655	2,264,903	2,864,074
Mar.	2,448,698	2,782,307	2,734,245
Apr.	2,558,958	2,691,503	2,568,008
May	2,650,665	2,499,149	2,316,482
June	2,527,632	2,676,937	.....
July	2,385,687	2,867,957	.....
Aug.	2,884,154	2,519,033	.....
Sept.	2,856,304	2,446,846	.....
Oct.	2,390,027	3,072,219	.....
Nov.	2,643,790	2,333,137	.....
Dec.	2,917,528	2,678,623	.....
Year	31,087,681	31,927,054	.....

Canada's Nickel Output

(Dominion Bureau of Statistics)

(In Tons)

	1957	1958	1959	1960
Jan.	16,609	16,710	8,047	17,399
Feb.	15,027	15,896	12,616	16,435
Mar.	16,733	15,853	14,922	17,780
Apr.	15,347	15,163	15,493	17,524
May	16,225	15,231	16,622	17,207
June	15,447	14,603	16,599	...
July	15,878	12,851	16,199	...
Aug.	16,756	12,597	16,784	...
Sept.	15,604	11,786	16,205	...
Oct.	15,628	3,682	17,212	...
Nov.	14,587	3,178	16,904	...
Dec.	15,096	3,298	18,738	...
Year	188,962	140,842	186,341	

Canadian Copper Exports

(Dominion Bureau of Statistics)

(In tons of 2,000 lbs.)

	1960		
	Apr.	May	June
Ore, matte, regulus, etc. (content)	2,432	2,332	3,142
United States	360	1,086	699
Norway	1,383	1,041	2,014
U. Kingdom	138	205	161
Japan	551	...	268
Ingots, bars, billets, anodes	21,135	20,767	24,831
United States	9,531	8,056	7,670
Brazil	2	138	...
Belgium	280	280	280
France	840	1,118	280
Finland	336	280	...
Germany (W.)	672	593	644
Greece	112	...	...
Italy	...	84	112
Netherlands	112	84	644
Sweden	112	...	112
Switzerland	...	...	112
U. Kingdom	8,724	9,672	12,335
Australia	...	...	280
India	397	458	2,361
Other countries	17	4	1
Total Exports:			
Crude & refined	23,567	23,099	27,973
Old and scrap	249	1,634	1,154
Rods, strips, sheet & tubing	1,111	1,935	1,722

Canadian Zinc Exports

(Dominion Bureau of Statistics)

(In tons of 2,000 lbs.)

	1960		
	Apr.	May	June
Ore (zinc content)	13,345	12,460	10,113
United States	12,670	12,460	10,113
Belgium	59	...	...
U. Kingdom	616	...	...
Slab zinc	10,281	13,440	22,409
United States	3,441	4,457	10,075
Brazil	190	231	172
Denmark	...	...	336
Germany (W.)	112	...	...
Netherlands	336	868	56
U. Kingdom	5,610	6,308	8,390
Korea	108	...	51
Hong Kong	56	...	...
Taiwan	...	33	99
India	318	1,543	2,921
Thailand	110	...	309
Total Exports:			
Ore and slabs	23,626	25,900	32,522
Zinc scrap, dross, ashes	58	1,029	727
United States	27	129	171
Belgium	...	705	189
Germany (W.)	...	...	138
Netherlands	...	195	142
Japan	31	...	87

French Copper Imports

(A. B. M. S.)

(In metric tons)

	1960		
	Apr.	May	June
Crude copper for refining (blister, black and cement)	813	...	813
Belgian Congo	813	...	813
Refined	16,126	19,201	14,758
United States	5,157	4,525	2,383
Canada	1,270	1,271	1,525
Chile	250	3,500	1,300
Belgium	3,845	5,196	4,379
Germany (W.)	651	119	319
Norway	...	152	...
Sweden	20	30	5
Belgian Congo	2,616	2,296	2,255
Rhodesia-Nyasaland	2,299	2,112	2,522
Other countries	18	...	70

Canadian Lead Exports

(Dominion Bureau of Statistics)

(In tons of 2,000 lbs.)

	1960		
	Apr.	May	June
Ore (lead content)	2,480	2,708	1,599
United States	1,803	2,708	1,599
Belgium	677	...	...
Refined lead	5,407	6,979	9,521
United States	1,630	1,858	3,396
U. Kingdom	3,426	4,821	5,596
Japan	261	110	456
Taiwan	...	132	...
India	90	56	56
Other countries	...	2	17
Total Exports:			
Ore & refined	7,887	9,687	11,120
Lead scrap	375	735	802

Copper Imports and Exports By Principal Countries

(A.B.M.S.)

Reported in ingots, slabs, etc.; metric tons except where otherwise noted.

	1960		
	Feb.	Mar.	Apr.
IMPORTS			
U. S. (blist., s.t.)	14,215	26,218	22,815
(ore, etc. s.t.)	9,899	8,256	10,768
(ref., s.t.)	22,599	17,962	10,087
Belgium*	21,596		
Denmark	517	431	400
France (crude)	813		813
(refined)	16,271	18,144	16,126
Italy	22,999		
Germany, West	26,463	39,388	
Netherlands	2,132	2,243	2,069
Norway	428	418	
Sweden	7,558	7,343	5,179
Switzerland	2,444	2,056	2,514
U. K. (l.t.)	40,076	43,927	43,110
India (blister/-ref., l.t.)†	2,825	5,835	2,344
Australia (blister & ref'd l.t.)		271	
EXPORTS			
U. S. (ore, and unref., s.t.)	809	1,108	671
(ref., s.t.)	19,029	21,239	31,329
Canada (ref., s.t.)	22,295	20,339	21,135
Belgium*	13,595		
Finland‡	535		
Germany, West	5,036	6,536	
Norway	977	1,515	
Sweden	2,332	1,820	1,316
U. K. (l.t.)	4,241	3,726	3,422
Turkey*	980	810	
Belgian Congo††	20,560		
No. Rhodesia (blister & ref., l.t.)†	37,709	53,118	39,988

† British Bureau of Non-Ferrous Metal Statistics.
†† Copper wire bars and ingot bars 99% and copper ingots 97%.
‡ Includes old.
* Includes alloys.

Canada's Nickel Exports

(Dominion Bureau of Statistics)

(Refined, in oxidse, matte, etc.)

(In Tons)

	1957	1958	1959	1960
Jan.	14,260	14,233	6,757	21,443
Feb.	9,974	12,157	7,976	14,680
Mar.	14,958	12,316	14,006	19,072
Apr.	18,671	20,962	14,213	13,892
May	19,351	20,574	16,142	14,351
June	14,539	16,144	15,901	.....
July	14,181	14,055	11,985	.....
Aug.	14,966	13,012	13,664	.....
Sept.	14,160	14,371	19,143	.....
Oct.	13,370	8,335	.....	.....
Nov.	16,620	3,001	.....	.....
Dec.	14,606	5,060	.....	.....
Year	178,656	154,220	.....	.....

French Zinc Imports

(A. B. M. S.)

(In metric tons)

	1960		
	Apr.	May	June
Ore (gross weight)	27,663	18,296	28,390
Belgium	567	...	779
Bulgaria	702	...	...
Finland	...	...	1,706
Greece	3,657	4,390	1,177
Italy	6,020	1,648	3,123
Norway	2,114	...	...
Spain	5,474	903	4,940
Yugoslavia	3,100	...	...
Algeria	1,500	5,165	6,396
Morocco	4,529	4,098	7,443
Tunisia	...	2,092	...
Belgian Congo	...	...	2,758
Burma	...	...	68
Slabs, bars, blocks, etc.	2,744	2,630	2,347
Belgium	1,819	1,935	1,940
Germany (W.)	...	129	30
Italy	102	51	51
Netherlands	308	...	266
Norway	515	500	...
Algeria	...	15	9
Peru	...	...	51

French Metal Exports

(A. B. M. S.)

(In metric tons)

	1960		
	Apr.	May	June
Lead			
Ore (gross Weight)	1,944	603	1,312
Pig lead	44	542	616
United States	...	...	262
Switzerland	...	252	256
Egypt	...	278	60
Other countries	44	12	38
Antimonial lead	97	108	102
COPPER			
Crude copper for refining (blister, black and cement)	653	708	929
Zinc			
Slabs, bars, blocks, etc.	548	371	465

U. K. Copper Imports

(British Bureau of Non-Ferrous Metal Statistics)

(In tons of 2,240 lbs.)

	1960		
	Mar.	Apr.	May
(Gross weight)			
Copper and copper alloys	43,927	43,110	59,090
U. of S. Africa	50	50	...
Rhodesia-Nyasaland	21,881	15,222	25,903
Canada	7,051	11,158	10,384
Belgium	104	102	452
Germany (W.)	436	42	34
Norway	200	200	301
United States	4,777	4,298	7,509
Chile	8,865	11,249	12,428
Peru	...	100	1,075
Belgian Congo	250	500	250
Other countries	313	189	754
Of which:			
Electrolytic	31,491	29,931	38,963
Other refined	4,600	3,625	8,445
Blister or wrought	7,397	9,015	10,656
Wrought and alloys	439	539	1,026
Total	43,927	43,110	59,090

Nonferrous Castings

MONTHLY SHIPMENTS, BY TYPE OF METAL
(Bureau of Census — Thousands of Pounds)

	Aluminum	Copper	Magnesium	Zinc	Lead Die
1954 Total	607,764	834,557	25,572	474,741	18,396
1955 Total	833,058	1,011,748	27,892	781,254	21,045
1956 Total	801,136	966,473	36,168	88,069	20,734
1957 Total	751,856	875,389	30,322	663,330	23,791
1958					
Total	596,816	739,915	27,228	508,297	18,920
1959					
February	62,486	69,589	2,162	48,779	1,285
March	73,351	78,641	2,129	57,600	1,765
April	72,976	82,799	2,455	57,325	1,862
May	68,268	78,413	2,370	60,656	2,025
June	66,471	79,730	2,484	56,128	2,007
July	56,911	67,073	2,265	46,756	1,858
August	55,904	68,979	2,243	46,566	1,898
September	66,193	76,045	2,263	58,144	2,218
October	67,499	79,832	2,436	59,214	2,068
November	54,557	70,674	2,023	46,270	1,755
December	64,939	73,558	2,163	60,652	1,346
Total	790,520	892,027	27,144	651,437	21,658
1960					
January	68,247	73,971	2,135	61,357	1,496
February	71,699	71,797	2,075	62,925	1,628
March	72,216	75,908	1,903	60,816	1,994
April	61,797	66,777	1,926	47,553	2,030
May	60,330	66,245	1,953	50,844	1,935

Copper Castings Shipments

BY TYPE OF CASTING
(Bureau of Census) (Thousands of Pounds)

	Total	Sand	Permanent Mold	Die	All Other
1952 Total	1,009,910	910,862	63,865	8,259	26,924
1953 Total	990,496	888,369	61,816	10,077	30,734
1954 Total	834,557	751,804	48,849	6,480	27,394
1955 Total	1,011,748	907,852	63,041	8,541	31,408
1956 Total	966,113	866,404	57,522	10,023	32,134
1957 Total	875,389	789,819	44,746	10,776	30,048
1958					
October	74,012	67,564	3,239	790	2,419
November	62,746	57,386	2,604	810	1,946
December	67,905	61,119	3,535	1,059	2,192
Total	739,985	667,255	36,529	10,201	22,681
1959					
February	66,589	62,593	3,557	1,176	2,263
March	78,641	69,472	4,333	1,361	3,475
April	82,799	73,567	4,640	1,328	3,264
May	78,413	69,351	4,363	1,291	3,408
June	79,730	70,836	4,421	1,175	3,298
July	69,073	61,650	3,869	946	2,608
August	68,979	60,346	4,410	993	3,230
September	76,045	66,517	4,810	1,138	3,580
October	79,832	69,583	5,172	1,169	3,908
November	70,674	61,490	4,893	1,160	3,131
December	73,558	64,579	4,337	1,130	3,512
Total	891,216	790,290	52,377	14,083	36,907
1960					
January	73,971	65,742	3,915	1,371	2,943
February	71,797	63,105	4,146	1,282	3,266
March	75,908	66,517	4,346	1,381	3,664
April	66,777	58,453	4,523	1,162	2,639
May	66,245	57,848	4,463	1,153	2,781

Nickel Averages

Electro, cathode sheets, 99.00%, f.o.b. refinery, duty included
(Cents Per Pound)

	1957	1958	1959	1960
Jan.	74.00	74.00	74.00	74.00
Feb.	74.00	74.00	74.00	74.00
Mar.	74.00	74.00	74.00	74.00
Apr.	74.00	74.00	74.00	74.00
May	74.00	74.00	74.00	74.00
June	74.00	74.00	74.00	74.00
July	74.00	74.00	74.00	74.00
Aug.	74.00	74.00	74.00	...
Sept.	74.00	74.00	74.00	...
Oct.	74.00	74.00	74.00	...
Nov.	74.00	74.00	74.00	...
Dec.	74.00	74.00	74.00	...
Aver.	74.00	74.00	74.00	...

Platinum Averages

N. Y. MONTHLY QUOTATIONS
(Dollars per Troy Ounce)

	1957	1958	1959	1960
Jan.	101.92	77.85	52.57	80.00
Feb.	98.59	74.82	59.25	83.29
Mar.	93.50	72.096	77.10	83.00
Apr.	93.45	70.72	77.18	83.00
May	92.865	67.34	77.50	83.00
June	92.02	66.18	77.50	83.00
July	90.265	64.35	78.00	83.00
Aug.	84.426	60.94	78.00	...
Sept.	84.00	59.50	78.00	...
Oct.	84.00	57.327	78.00	...
Nov.	83.80	56.41	78.44	...
Dec.	78.70	53.154	78.50	...
Aver.	89.79	65.07	74.17	...

Spot Straits Tin

(Straits, Open Market, N. Y.)
Monthly Average Prices

	1957	1958	1959	1960
Jan.	101.511	92.94	99.411	99.863
Feb.	101.132	93.915	102.785	101.178
Mar.	99.643	94.452	103.042	100.228
Apr.	99.304	93.988	102.505	99.25
May	93.347	94.512	103.125	99.554
June	98.05	94.708	104.25	101.377
July	96.52	94.898	102.337	103.588
Aug.	94.261	94.988	102.333	...
Sept.	93.406	94.101	102.44	...
Oct.	91.838	96.523	102.238	...
Nov.	89.236	99.118	101.021	...
Dec.	92.35	98.989	99.176	...
Aver.	96.301	95.177	102.055	...

Prompt Tin Prices

(Straits, Open Market, N. Y.)
Monthly Average Prices
(Cents Per Pound)

	1957	1958	1959	1960
Jan.	101.347	92.653	99.351	99.863
Feb.	100.257	93.763	102.708	100.987
Mar.	99.476	94.363	103.042	100.098
Apr.	99.288	92.988	102.505	99.25
May	98.335	94.512	103.107	99.548
June	98.025	94.619	104.142	101.318
July	96.44	94.892	102.337	103.525
Aug.	94.159	94.976	102.345	...
Sept.	93.313	94.054	102.435	...
Oct.	91.848	96.455	102.238	...
Nov.	89.236	98.985	100.972	...
Dec.	92.34	98.96	99.176	...
Aver.	93.672	95.069	102.03	...

Quicksilver Averages

N. Y. Monthly Averages
Virgin, Dollars per 76-lb Flask

	1957	1958	1959	1960
Jan.	256.00	224.35	219.50	211.30
Feb.	256.00	229.39	219.50	212.68
Mar.	256.00	232.096	223.57	214.00
Apr.	256.00	233.06	239.52	214.00
May	256.00	229.48	245.86	214.00
June	256.00	229.00	241.64	212.00
July	256.00	230.25	236.74	210.00
Aug.	252.20	240.27	232.524	...
Sept.	248.58	241.12	225.429	...
Oct.	234.48	235.94	224.548	...
Nov.	228.33	230.05	217.944	...
Dec.	226.50	223.54	215.05	...
Aver.	248.51	230.96	228.49	..

Primary Aluminum Output, Shipments and Stocks

(U. S. Department of Interior)

	Stocks beginning of month short tons	Production short tons	Sold or Used — Short tons	Sold or Used — Value f. o. b. plant	Stocks end of month short tons
1958					
Total	....	1,565,556	1,595,067	.....	.....
1959					
April	159,177	155,213	182,930	90,070,280	131,460
May	131,460	163,857	182,607	89,672,327	112,710
June	112,710	167,323	191,421	93,955,552	88,612
July	88,612	179,194	187,387	91,635,864	80,419
August	80,419	172,816	159,206	77,711,678	94,029
September	94,029	168,206	153,170	74,809,052	109,065
October	109,065	173,742	151,683	73,293,070	131,124
November	131,124	153,665	152,024	74,247,828	132,765
December	132,765	162,996	184,123	89,712,146	111,638
Total	....	1,953,017	1,987,465	.....	.....
1960					
January	111,638	164,023	148,129	$73,424,794	127,352
February	127,532	156,825	167,215	83,087,192	117,142
March	117,142	170,688	172,846	88,761,065	114,984
April	114,984	168,596	144,469	73,561,622	139,111
May	139,111	175,863	166,403	85,418,807	148,571

Aluminum Wrought Products

PRODUCERS' MONTHLY NET SHIPMENTS

(Bureau of Census — Thousands of Pounds)

	Total	Sheet, Plate, Foil, Rod & Bar	Wire & Cable	Extruded Shapes & Tubing	Powder & Paste
1955 Total	2,805,500	1,542,868	365,391	812,311	35,854
1956 Total	2,870,101	1,577,601	398,602	782,398	26,017
1957 Total	2,677,423	1,396,502	399,040	789,430	28,187
1958					
Total	2,624,911	1,441,385	285,355	821,249	25,742
1959					
March	271,642	161,285	21,940	81,276	2,578
April	293,554	166,942	25,468	93,475	3,178
May	320,786	184,664	28,532	99,308	3,641
June	341,389	195,476	30,156	107,038	3,901
July	373,060	211,850	39,902	111,661	4,708
August	247,833	126,512	29,411	85,380	2,537
September	262,749	140,313	25,843	89,986	2,419
October	287,081	154,669	27,614	97,478	2,697
November	247,260	136,516	20,528	83,594	2,304
December	268,155	152,007	24,210	84,504	2,606
Total	3,397,705	1,894,159	321,824	1,075,373	34,843
1960					
January	250,116	141,060	22,475	78,674	3,370
February	256,017	147,026	22,626	79,268	2,435
March	267,149	152,580	24,682	82,584	2,180
April	247,382	139,762	24,026	76,838	2,227
May	268,228	156,542	25,218	84,202	2,266
June	258,700	151,619	19,114	84,574	3,393

Aluminum Castings Shipments

(Bureau of Census)

BY TYPE OF CASTING

(Thousands of Pounds)

	Total	Sand	Permanent Mold	Die	All Other
1954 Total	609,066	155,738	213,968	232,726	6,806
1955 Total	833,058	171,757	298,115	354,804	8,282
1956 Total	801,036	171,763	245,421	376,108	7,736
1957 Total	751,656	144,121	232,326	369,086	...
1958					
Total	596,790	117,421	186,949	292,599	...
1959					
March	73,351	12,412	26,964	33,949	...
April	72,976	12,700	26,153	33,992	...
May	68,268	11,979	25,283	30,877	...
June	66,471	12,306	24,927	29,092	...
July	56,911	11,581	20,410	24,786	...
August	55,904	11,130	17,824	26,818	...
September	66,193	12,309	21,506	32,239	...
October	67,499	12,958	21,781	32,640	...
November	54,557	10,813	16,326	27,303	...
December	64,939	12,409	19,902	32,523	...
Total	772,212	142,131	262,179	346,589	...
1960					
January	68,247	11,278	22,368	34,514	...
February	71,699	11,800	23,614	36,177	...
March	72,216	12,934	22,413	36,749	...
April	61,797	12,339	19,950	29,400	...
May	60,330	10,682	21,507	28,055	...

Virgin Aluminum

Ingot (30 lb.) 99½% Plus, Delivered

Monthly Average Prices

(Cents Per Pound)

	1957	1958	1959	1960
Jan.	27.10	28.10	26.80	28.10
Feb.	27.10	28.10	26.80	28.10
Mar.	27.10	28.10	26.80	28.10
Apr.	27.10	26.10	26.80	28.10
May	27.10	26.10	26.80	28.10
June	27.10	26.10	26.80	28.10
July	27.10	26.10	26.80	28.10
Aug.	28.10	26.77	26.80	....
Sept.	28.10	26.80	26.80	....
Oct.	28.10	26.80	26.80	....
Nov.	28.10	26.80	26.80	....
Dec.	28.10	26.80	27.361	....
Aver.	27.517	26.889	26.847	....

Magnesium Wrought Products Shipments

(Bureau of Census)

(Thousands of Pounds)

	1957	1958	1959	1960
Jan.	2,130	1,271	1,271	1,535
Feb.	2,522	1,280	1,691	1,724
Mar.	2,388	1,398	1,717	1,966
Apr.	2,511	1,479	2,089	1,790
May	2,230	1,443	1,644	1,989
June	1,881	1,709	1,946	1,945
July	1,428	1,227	1,681	....
Aug.	1,540	1,823	1,823	....
Sept.	1,501	1,807	1,807	....
Oct.	1,453	1,983	2,220	....
Nov.	1,230	1,662	1,320	....
Dec.	1,102	1,622	1,675	....
Total	21,915	18,702	20,884	....

Cadmium Averages

(Cents Per Pound)

N. Y. Monthly Averages

Cents per lb. in ton lots

	1957	1958	1959	1960
Jan.	170.00	155.00	145.00	148.50
Feb.	170.00	155.00	145.00	150.00
Mar.	170.00	155.00	145.00	150.00
Apr.	170.00	155.00	120.00	150.00
May	170.00	155.00	120.00	150.00
June	170.00	155.00	120.00	150.00
July	170.00	155.00	120.00	150.00
Aug.	170.00	155.00	120.00	....
Sept.	170.00	152.60	120.00	....
Oct.	170.00	145.00	*140.00	....
Nov.	170.00	145.00	140.00	....
Dec.	166.40	145.00	140.00	....
Aver.	169.70	152.30	132.00	....

* As of Oct. 1, 1959, for lots of up to one ton.

Steel Ingot Production

(American Iron and Steel Institute)

Period	Estimated Production — All Companies OPEN HEARTH Net tons	% of capacity	BESSEMER Net tons	% of capacity	ELECTRIC Net tons	% of capacity	TOTAL Net tons	% of capacity	Calculated weekly production, all companies (net tons)
1954 Total	80,327,494	73.6	2,548,104	53.2	5,436,054	52.0	88,311,652	71.0	1,693,741
1956 Total	102,840,585	91.6	3,227,997	67.4	9,147,567	81.2	115,216,149	89.8	2,203,828
1957 Total	101,657,776	87.0	2,475,138	54.9	8,582,082	71.3	112,714,996	84.5	2,161,776
1958									
Total	75,888,392	62.0	1,396,348	34.7	7,972,623	55.4	85,257,363	69.6	1,635,162
1959									
February	8,540,000	88.0	129,000	47.0	757,000	73.1	9,603,000	84.8	2,401,000
March	10,216,474	95.1	184,892	60.9	929,784	81.1	11,567,745	92.3	2,611,229
April	9,884,332	95.0	196,000	66.2	964,850	87.0	11,281,920	93.0	2,629,818
May	10,117,968	94.2	200,887	66.1	1,024,401	89.4	11,600,581	92.5	2,618,441
June	9,521,053	91.6	185,794	63.2	941,056	84.8	10,907,634	89.9	2,542,572
July	4,540,182	42.2	66,433	21.9	526,025	45.9	5,227,129	41.7	1,182,608
August	1,171,342	10.9	.....	...	267,935	23.4	1,439,277	11.5	324,893
September	1,219,398	12.0	.....	...	285,619	25.8	1,535,017	12.7	358,649
October	1,385,490	12.9	.....	...	319,043	27.8	1,704,533	13.6	384,770
November	6,290,659	60.5	92,361	31.4	754,793	68.0	7,267,607	52.9	1,694,081
December	10,468,534	92.4	205,666	67.7	1,033,668	90.2	11,989,319	95.6	2,712,516
Total	81,668,997	64.5	1,380,283	38.6	8,532,514	63.2	93,446,132	63.3	1,792,216
1960									
January	10,510,616	97.7	211,132	73.2	1,046,675	85.6	12,049,404	95.5	2,719,956
February	9,713,527	94.0	216,263	80.2	949,588	83.0	11,126,806	94.3	2,687,634
March	10,103,122	93.9	202,812	70.3	952,008	77.9	11,564,683	91.6	2,610,538
April	8,603,306	82.7	105,336	37.7	766,452	64.8	9,777,857	80.1	2,279,221
May	7,844,140	72.9	73,010	25.3	603,817	49.4	8,830,472	70.0	1,993,335
June	6,439,000	61.9	80,000	28.7	560,000	47.3	7,394,000	60.6	1,724,000
July	5,491,000	51.1	62,000	21.5	501,000	41.0	6,343,000	50.3	1,435,000

Blast Furnace Output

(American Iron and Steel Institute)

	net tons Pig Iron	Ferro-manganese & Spiegel	Total	% Capacity
1951				
Tl. Yr.	70,487,380	745,381	71,232,761	98.3
1952				
Tl. Yr.	61,528,665	629,926	62,158,591	84.2
1953				
Total	74,987,721	855,038	75,842,759	95.5
1954				
Total	58,119,382	568,735	58,688,117	71.6
1955				
Total	77,114,073	868,758	77,800,831	92.7
1956				
Total	75,301,134	664,341	75,965,475	88.9
1957				
Total	78,557,011	782,660	79,339,671	91.4
1958				
Feb.	4,016,276	47,953	4,064,229	58.2
Mar.	4,418,778	45,175	4,463,953	57.8
April	3,787,907	39,302	3,827,209	51.2
May	4,048,328	25,468	4,073,796	52.7
June	4,396,285	26,463	4,422,748	59.1
July	4,277,515	26,668	4,304,183	55.7
Aug.	4,799,955	31,374	4,831,329	62.1
Sept.	5,041,042	31,348	5,072,390	67.8
Oct.	5,835,995	36,963	5,872,958	76.0
Nov.	5,907,888	39,275	5,946,163	79.5
Dec.	6,025,385	47,506	6,072,890	78.6
Total	57,298,644	465,456	37,298,644	63.5
1959				
Jan.	6,260,395	48,572	6,211,823	77.9
Feb.	6,047,398	45,274	6,192,672	85.3
March	7,461,760	48,291	7,510,051	93.4
April	7,338,372	54,234	7,392,606	95.0
May	7,683,759	64,237	7,747,996	96.4
June	7,231,631	58,315	7,289,946	93.7
July	3,550,159	23,391	3,573,550	44.5
Aug.	.....	....	947,779	11.8
Sept.	.....	....	949,103	12.2
Oct.	.....	....	1,017,659	12.7
Nov.	4,199,101	20,172	4,219,273	54.2
Dec.	7,638,359	65,728	7,704,087	95.0
Total	60,322,426	452,313	60,774,738	...
1960				
Jan.	7,753,753	76,344	7,830,097	95.5
Feb.	7,342,469	71,533	7,414,002	...
March	7,713,696	79,715	7,793,411	95.1
April	6,770,229	69,864	6,830,093	86.1
May	6,030,992	63,419	6,394,411	78.0
June	5,261,171	48,316	5,309,487	66.9
July	4,480,144	43,353	4,523,497	55.2

Steel Castings Shipments

(Bureau of Census)

	(Short Tons) Total	For Sale	For Own Use
1951	2,101,604	1,507,413	594,191
1952	1,925,116	1,476,352	448,767
1953	1,829,277	1,290,016	431,330
1954	1,184,096	880,158	303,938
1955	1,530,694	1,166,706	363,988
1956	1,931,987	1,512,290	416,697
1957			
Total	1,766,191	1,261,301	406,444
1958			
Apr.	91,464	69,121	22,343
May	87,002	66,086	20,916
June	92,681	71,624	21,237
July	68,802	48,618	10,184
Aug.	80,886	59,816	21,070
Sept.	85,277	64,586	20,691
Oct.	95,389	73,367	22,022
Nov.	85,267	65,788	19,479
Dec.	103,800	81,360	22,440
Total	1,114,939	859,125	255,814
1959			
Jan.	105,392	82,693	22,709
Feb.	110,280	86,013	24,267
Mar.	131,317	103,848	27,469
Apr.	134,344	104,890	29,454
May	135,359	105,804	29,555
June	143,624	111,725	31,899
July	106,790	83,541	23,249
Aug.	98,014	79,188	18,826
Sept.	99,731	79,963	19,768
Oct.	105,570	84,850	20,720
Nov.	109,460	86,026	23,434
Dec.	103,800	81,360	23,440
Total	1,023,861	919,181	294,430
1960			
Jan.	122,565	94,052	28,513
Feb.	129,259	97,927	31,332
Mar.	143,708	109,688	34,020
Apr.	127,219	96,557	30,662
May	135,359	105,804	29,555

Galvanized Sheet Shipments

(American Iron & Steel Institute)

(Net Tons)

	1957	1958	1959	1960
Jan.	235,902	186,649	279,244	323,073
Feb.	205,048	167,627	281,637	289,583
Mar.	206,836	195,885	311,961	329,395
Apr.	198,585	206,368	328,759	295,627
May	206,657	231,318	317,059	288,162
June	239,037	277,180	350,333	275,974
July	167,247	239,883	180,787	
Aug.	186,790	253,263	N.A.	
Sept.	183,952	258,723	N.A.	
Oct.	212,886	290,157	N.A.	
Nov.	190,380	253,909	196,644	
Dec.	159,363	266,472	301,911	
Total	2,392,637	2,828,848	2,772,835	

N.A.—Not available.

SHIPMENTS OF TIN-TERNEPLATE

(American Iron & Steel Institute)

(Net Tons)

	—Hot Dipped— 1959	1960	—Electrolytic— 1959	1960
Jan.	30,304	32,525	417,210	493,828
Feb.	24,602	29,385	442,625	443,619
Mar.	46,705	38,131	597,408	538,166
Apr.	54,906	37,106	689,998	470,716
May	64,110	37,705	689,064	473,083
June	62,965	51,810	673,819	548,198
July	36,381	....	244,719	....
Aug.	N.A.	....	N.A.	....
Sept.	N.A.	....	N.A.	....
Oct.	N.A.	....	N.A.	....
Nov.	21,782	....	296,641	....
Dec.	31,487	....	464,080	....
Total	412,123	....	4,858,511	....

N.A.—Not available.

Steel Ingot Operations

(Precentage of Capacity as Reported by American Iron & Steel Institute)

Week Beginning	1957	1958	1959	1960
Jan. 4...	98.4	56.1	76.2	95.3
Jan. 11...	96.4	57.0	73.6	95.7
Jan. 18...	96.6	55.5	74.6	95.4
Jan. 25...	97.6	54.0	72.6	94.2
Feb. 1...	97.1	54.0	76.9	94.3
Feb. 8...	97.7	53.5	83.8	95.7
Feb. 15...	97.8	50.9	83.7	93.8
Feb. 22...	96.0	54.6	88.5	94.4
Feb. 29...	97.1	53.1	90.3	92.8
Mar. 7...	93.8	52.4	92.0	93.1
Mar. 14...	93.5	52.5	92.9	91.5
Mar. 21...	92.4	50.6	92.9	91.1
Mar. 28...	90.6	48.6	93.2	88.7
Apr. 4...	90.3	48.5	93.3	84.8
Apr. 11...	90.4	46.8	93.8	78.1
Apr. 18...	88.7	47.9	93.5	78.5
Apr. 25...	87.0	47.8	94.2	77.6
May 2...	86.7	49.4	92.0	75.0
May 9...	84.2	52.3	92.9	73.8
May 16...	86.4	56.4	93.4	71.3
May 23...	88.0	58.1	93.6	65.6
May 30...	87.5	62.5	93.7	60.6
June 6...	86.5	84.0	92.0	61.6
June 13...	85.2	64.9	92.5	62.3
June 20...	84.0	61.7	87.8	61.0
June 27...	78.5	51.0	78.2	53.0
July 4...	78.7	53.4	79.5	42.2
July 11...	79.3	54.9	38.7	51.8
July 18...	79.4	57.3	12.9	54.4
July 25...	79.4	57.8	12.2	53.3
Aug. 1...	79.8	58.8	11.2	53.9
Aug. 8...	80.6	60.5	11.8	53.5
Aug. 15...	82.1	62.6	11.3	54.7
Aug. 22...	82.2	63.5	11.7	54.5
Aug. 29...	81.0	61.7	11.5	...
Sept. 5...	81.9	65.9	11.6	...
Sept. 12...	82.1	65.6	12.6	...
Sept. 19...	82.2	67.3	12.8	...
Sept. 26...	82.6	70.4	12.8	...
Oct. 3...	82.8	71.6	12.8	...
Oct. 10...	80.9	74.2	13.0	...
Oct. 17...	80.2	74.8	13.1	...
Oct. 24...	79.7	75.0	13.1	...
Oct. 31...	78.0	74.5	13.0	...
Nov. 7...	77.7	74.5	45.6	...
Nov. 14...	76.0	74.1	78.9	...
Nov. 21...	72.1	73.7	89.7	...
Nov. 28...	71.5	73.5	93.6	...
Dec. 5...	69.2	73.5	96.5	...
Dec. 12...	67.7	74.5	96.3	...
Dec. 19...	53.7	74.5	94.9	...
Dec. 26...	59.0	73.6	96.3	...

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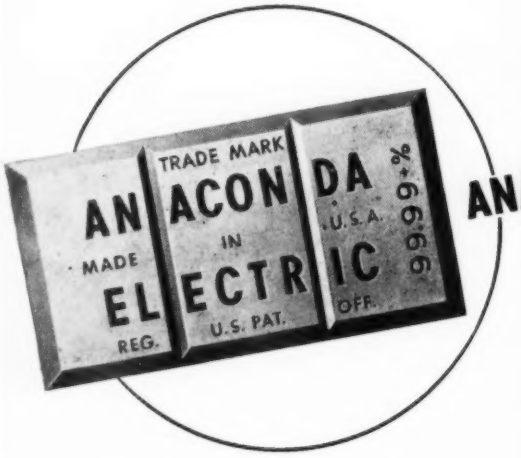

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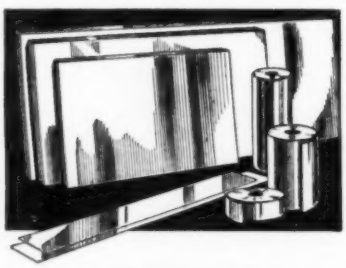

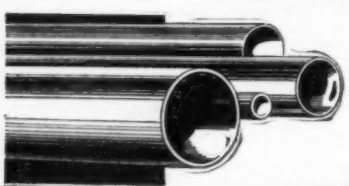

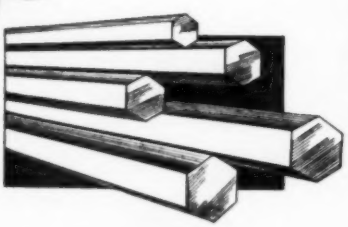

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